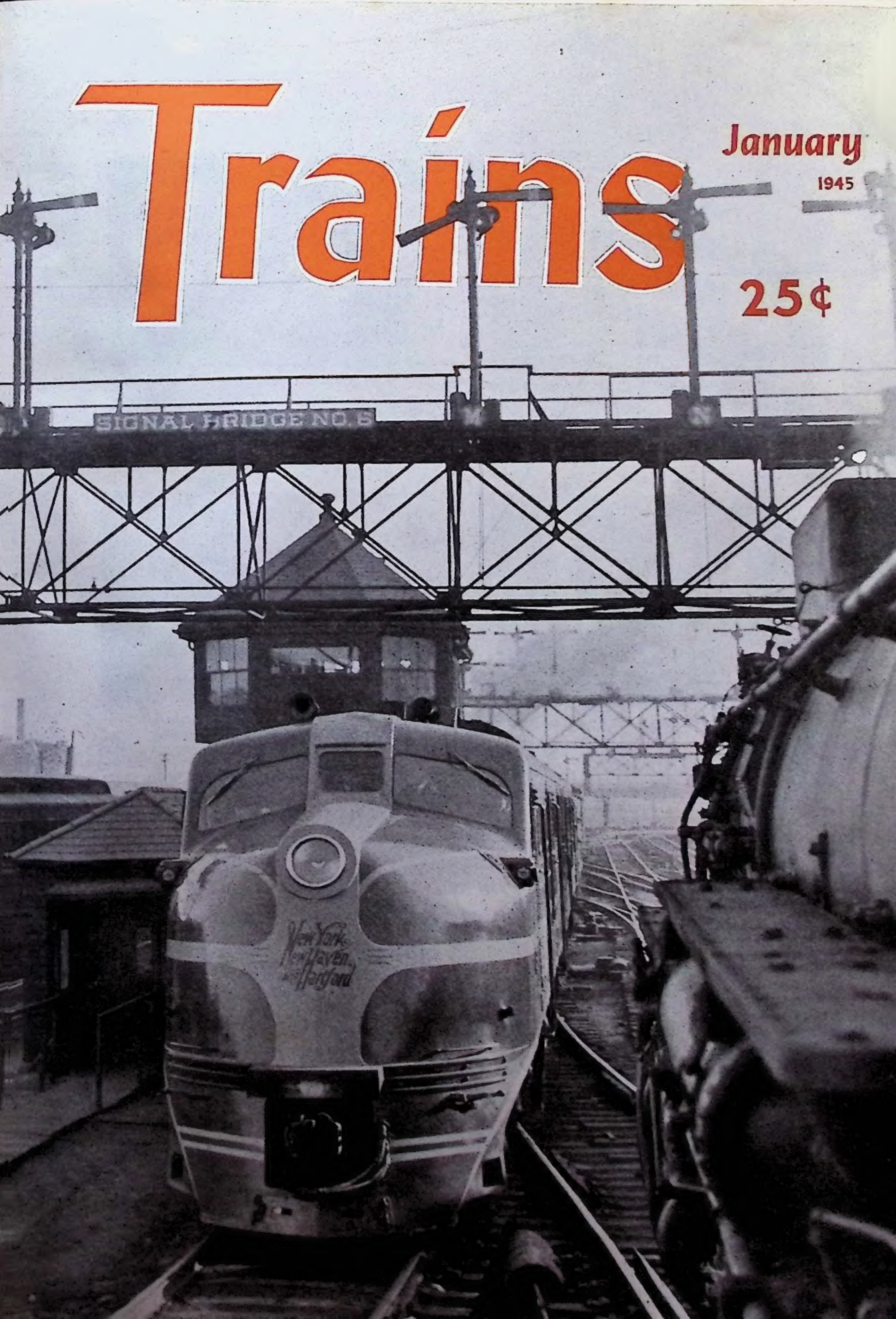
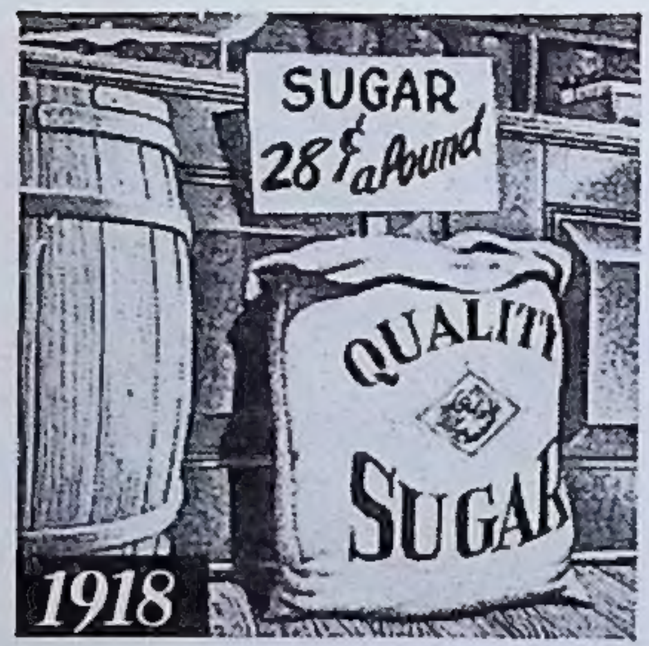
Trains

January
1945

25¢



THE DOUGH YOU BLOW —will bring U.S. woe!



What a boom we were handed by World War No. 1! Money came easily—went easily. Everybody was splurging on everything. Prices went skying. Sugar eventually hit 28¢ a pound!

Bye-bye, boom. Factories closed; men laid off. Prices and wages sinking fast. With jobs scarce, some of that dough we'd blown would have come in mighty handy then.

Prosperity. Stocks up fifty points in a week. Again everybody was buying everything—regardless of cost. Depression? Phooey . . . We thought we'd found a way to *lick* depressions.

Or had we? Bread lines, apple venders. WPA. Prices dropping. Wages dropping. Everything dropping—except the mortgage. "What goes up must come down." Depression follows a rise.

We're splurging again. Americans have been earning more. But even today there are fewer goods to spend it on—so naturally prices rise. DON'T LET *IT* ALL HAPPEN AGAIN!

---

4 THINGS TO DO to keep prices down and help avoid another depression

1. Buy only what you really need.
2. When you buy, pay no more than the ceiling prices. Pay your ration points in full.
3. Keep your *own* prices down. Don't take advantage of war conditions to ask for more—for your labor, your services, or the goods you sell.
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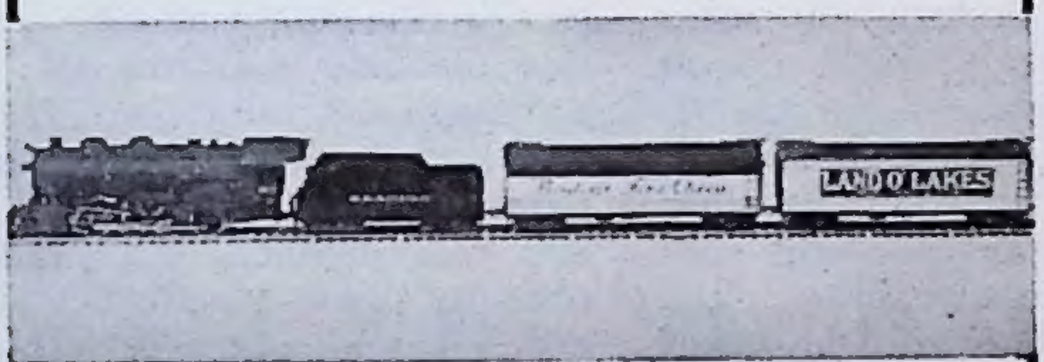

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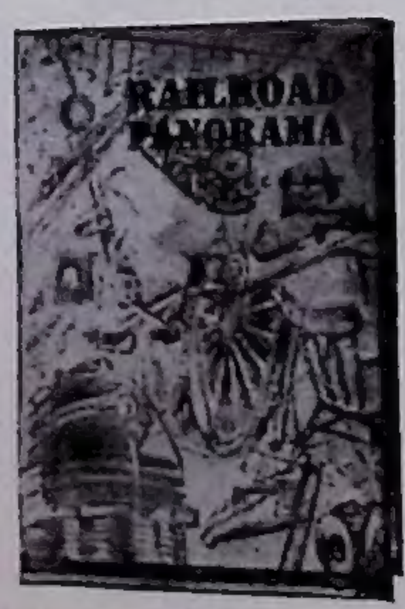
by A. C. Kalmbach



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—Model Builder, October, 1944

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Significantly, "Pal" Holland has five sons who went into service, *all five former "North Western" employes.* And a grand lot they are! There's Cyril, in the Field Artillery, now in the Southwest Pacific. And Sergeants Leon and Arthur, both fighting in France—Leon with the Engineers, Arthur in a Gun Battalion. Creighton, too, is in France, with the Infantry.

Finally, there's Blaine, who enlisted in the Navy. A medical discharge brought him back to Norway, so once again he's a member of the "North Western" family, working as a section laborer.

★ ★ ★

When a "North Western" man steps out of his working clothes and into Uncle Sam's uniform, we admire him for it. But when five of them, all from the same family, don fighting garb, it's a story well worth telling. Naturally, we're proud of the Hollands. They're typical of legions of Americans, each fighting in his way to speed the day of total victory.

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Trains

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American railroads produce the world's most efficient common-carrier mass transportation and are the foundation of our country's industrial productivity.

THE Transportation Association recommends, in its annual report, that regulation of transportation be guided solely by two general policies: first, to assure the shipper of the most dependable and efficient services, regardless of the type of facility, and second, at the lowest rates consistent with a fair opportunity for the investor to earn a reasonable return upon private capital, prudently invested. The association further asks a national policy providing for the leisurely reorganization of common carriers so that the industry as a whole will become responsive to efficient regulation; that regulation and promotion of all common carriers be centralized in a single federal agency; and that as a first step toward accomplishing such aims, Congress should undertake a complete reappraisal of national transportation policy in view of changing conditions of the past 25 years.

This makes sense to us. The railroads cannot object when other carriers are truly more efficient in doing a part of the transportation job, but every citizen, regardless of his thoughts about railroads, should have plenty to say against using tax money to create deceptively low rates for any form of common-carrier or even private-carrier transportation. If rates reflect the true and complete cost of transportation service, as they do in the case of railroad rates, traffic will automatically flow in the form of transportation which, service and rates considered, best suits each transportation assignment. Only in this way will our country have the lowest *total* transportation bill.

As it is, a man who takes $50 out of his right pocket for an airplane ticket has no idea how much is coming out of his left pocket in the form of tax support, air-mail subsidy, airports, airways, and so on. The man who takes $100 from his right pocket for a shipment by truck has no idea how much also comes from his left pocket for tax money appropriated for highways. And the corporation which pays a $1000 invoice for inland waterways cargo has very little idea about the true cost of operating these waterways, which is many times as great per ton-mile as the rates.

Pennsylvania Experiments

The mystery of the Pennsylvania Railroad experimental locomotives has finally been cleared up. Almost everybody, including this office, was puzzled for many months by conflicting reports of a 4-6-4-4 and a 4-4-6-4, both four-cylinder jobs. When the Q-2 4-4-6-4 freight locomotive, of which 25 are being built at Altoona, was announced [October TRAINS], it was assumed the people who had seen a 4-6-4-4 were astigmatic, but last month the railroad finally uncorked a complete exhibit of its recent steam locomotives and there the two were, side by side—the Q-1, 4-6-4-4 wheel arrangement with the back pair of cylinders arranged backwards, and the Q-2, of 4-4-6-4 wheel arrangement with both pairs of cylinders facing in the usual direction.

This makes five recent experimental coal-burning steam locomotive designs on the Pennsylvania: the S-2 6-8-6 turbine locomotive [see page 14, this issue], the S-1 World's Fair locomotive of same wheel arrangement but with two pairs of reciprocating engines, the T-1 4-4-4-4 which has succeeded the S-1 as a high-speed passenger reciprocating design, and the two Q designs for freight service.

Whyte's classification of locomotives by wheel arrangements is hardly adequate for the various four-cylinder designs. Both Q's, for instance, have 10 driving wheels mounted in one rigid frame and could be classified as 4-10-4's. The Pennsylvania leans to this in classifying them both as Q's (the letter in PRR locomotive symbols indicates the wheel arrangement), and yet this classification fails to distinguish between the couplings to the front and rear engines. The same applies to the S-1 and S-2, one of which has all eight drivers driven by a single turbine and the other by four cylinders, paired off with groups of four drivers.

While other locomotives have more starting tractive effort, a total boiler and superheater heating surface of 9655 square feet would appear to give the distinction of most powerful locomotive in its working speed range to the Q-2. We know of no other locomotive which compares with this heating surface figure, and with steam locomotives of conventional reciprocating design and conventional valve gear the horsepower at speed is quite accurately in proportion to heating surface.

Erie Freight Diesels

The Erie's six 5400-horsepower freight Diesels, put into service two months ago between Marion, O., and Meadville, N. Y., were purchased to overcome a specific operating problem, the continuous up-and-down profile which made the Kent and Mahoning divisions the Erie's traffic bottleneck between New York and Chicago. Eastbound freights had to be split into shorter trains at Marion, and westbound freights at Meadville, only to be tied together again a few hours later, and it was originally proposed to spend many millions reducing grades and curvature so that the same trains could be handled east of Marion. The Diesels were purchased as a less expensive solution of the problem.

Publicity Sense

One of the reasons the B&O is now putting its emblem on the front end of all engines is that this will get the B&O's name in the picture when photos are taken showing the front end of the locomotive.

Railway Performance in Handling Passengers

	July 1920	July 1940	July 1942	July 1943	July 1944
Number of passenger locomotives	13,562	7,306	7,017	6,823	6,794
Number of passenger-carrying cars	41,564	27,592	27,706	27,902	28,545*
Passengers carried one mile (thousands), average daily	154,871	72,374	153,693	269,958	280,830
Passenger train-miles, average daily	1,568,000	1,082,000	1,159,000	1,282,000	1,297,000
Pass. train-miles per locomotive, average daily	116	148	165	188	191
Passenger-carrying car-miles, average daily	7,008,000	4,892,000	6,271,000	7,967,000	8,272,000
Average miles per pass. car daily	168	177	226	285	290
Average pass.-carrying cars per train	4.5	4.5	5.4	6.2	6.4
Average passengers per car	22.1	14.8	24.5	33.9	33.9
Average passengers per train	98.7	66.9	133.0	210.5	216.4
Average trip per passenger (individual railway)	41.9	57.2	79.2	98.6	102.4
Passengers carried one mile per locomotive, average daily	11,419	9,906	21,903	39,566	41,335
Passengers carried one mile per pass. car, average daily	3,726	2,623	5,547	9,675	9,819

* Estimated.

Statistics given in the accompanying table from Railway Age show how the railways have accomplished what a few years ago would have been regarded as the impossible task of handling with fewer locomotives and cars a passenger traffic which this year is four and one-third times as large as in 1940.

Florida East Coast

The Atlantic Coast Line is ready, if the I. C. C. approves, to purchase 60 per cent of the common stock of the Florida East Coast upon reorganization of the latter road. Since the Florida East Coast is geographically a southern extension of the Coast Line, the two roads have always worked closely together, but the purpose of the proposed plan is to permit operation of the FEC as a part of the ACL system. Existing joint through routes to and from FEC points in connection with Southern and Seaboard would not be closed.

Some Brush-Off!

The Pennsylvania has installed an automatic car washer at Pittsburgh to take care of washing the more than 200 passenger cars which terminate there daily.

More Santa Fe C. T. C.

Close on completion of 115 miles of centralized traffic control between Los Angeles and San Diego on the Santa Fe comes announcement of orders for C. T. C. on 40 miles between Fullerton and Riverside, Calif., on the Santa Fe's southern route into Los Angeles, used mostly by freight. The orders also include the Atwood-Orange cutoff, which connects the transcontinental route directly with the San Diego line.

New CRI&P Streamliner

By a very clever rearrangement of existing schedules and equipment the Rock Island is putting into service a new streamlined train service while conforming to both the spirit and the letter of O. D. T. regulations. The new train, to start January 14, will be the Diesel-powered *Twin Star Rocket*, operating with through reclining-seat coaches, parlor and dining cars, and Pullmans (between Houston and Kansas City) over the Mid-Continent Route between Minneapolis and Houston, thus connecting the Lone Star State and the North Star State.

All of this route, the most direct between Texas and Minnesota, is now covered by daytime *Rockets*, but the new service goes right through even though part of the run is overnight. Between Minneapolis and Kansas City and between Fort Worth and Houston the new schedule is only a slight change from that of the present *Rockets*, but on the Kansas City-Fort Worth stretch the new service at night does not displace the daytime *Rockets*, which will continue on a somewhat altered and improved schedule, giving better service to Oklahoma City.

Another Trainshed Going

Another of the old high trainsheds which characterized American railroad stations for nearly a century is being torn down. The 50-foot-high gothic arch across six of the tracks of the Illinois Central station in Chicago is already nearly gone, and an almost flat, smoke-slotted roof is arising in its place. The low roof will not only be less drafty, but will cost less to maintain.

A. C. Kalmbach.

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Cover photo by H. W. Pontin, Railroad Photographic Club.

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The Bieber Line

200-mile connecting link between Western Pacific and Great Northern is one of West's newest lines

BY PHILIP C. JOHNSON*

NOVEMBER 10, 1931. The pilots of Great Northern Railway's engine No. 3351 and Western Pacific's No. 204 nosed each other at the little hamlet of Bieber, Lassen County, Calif., signifying the completion of one of the West's newest rail lines, the 200-mile Bieber Line joining the two great railroad systems. Hardly had the blows of Arthur Curtis James' hammer upon the golden spike echoed away before the first long freight train rumbled through Bieber. The rumbling has steadily grown in tempo as the life blood of the Great Northern, the Western Pacific and the McCloud River Railroad has poured onto the new line, the capacity of which has been challenged only by World War II's endless trainloads of materiel. Thanks to the farsightedness of its planners, the Bieber Line has been able to handle this tremendous traffic increase in perfect stride. Perhaps no new railroad construction in the country during the past several decades has justified so ably its existence as a prime mover of heavy tonnage as this connecting link between the Pacific Northwest and California.

The route is composed of the Great Northern's 90-mile section between Klamath Falls, Ore., and Bieber, and the Western Pacific's 110 miles between Bieber and its main line at Keddie in the heart of the famous Feather River country. Making through connections between the Great Northern's transcontinental line and the San Francisco area, it is a fulfillment of one of Jim Hill's fondest dreams—to enter California with his railroad empire. Perhaps it wasn't accomplished quite as he planned it, but nevertheless trains of the GN have rolled into California for over a decade now and a considerable part of the Big G's freight volume comes to it over the Bieber Line from all parts of the Golden State. The GN and the WP operate their respective divisions north and south of Bieber and use common yard and roundhouse facilities at that point.

Besides its value as a through traffic artery, the Bieber Line has been valuable because of local freight traffic which it originates. The McCloud River Railroad, a lumber line, joins the GN at Lookout, a few miles north of Bieber, by means of a connecting link from Hambone built by the GN at the same time the Bieber Line was constructed. Pine sawmills at Klamath Falls and at McCloud and Westwood, Calif., among the largest in the West, are either directly on the line or are easily accessible to it. Other large mills at Tionesta, Bieber and Greenville, all in California, help swell the volume of lumber shipped over the Bieber Line. Potatoes from the Klamath country and livestock also make up an important source of on-line revenue. Almost the entire 200 miles traverses immense areas of summer range to and from which sheep by the tens of thousands must be moved and returned each year and where large herds of cattle are turned loose to vie with deer and antelope for summer forage.

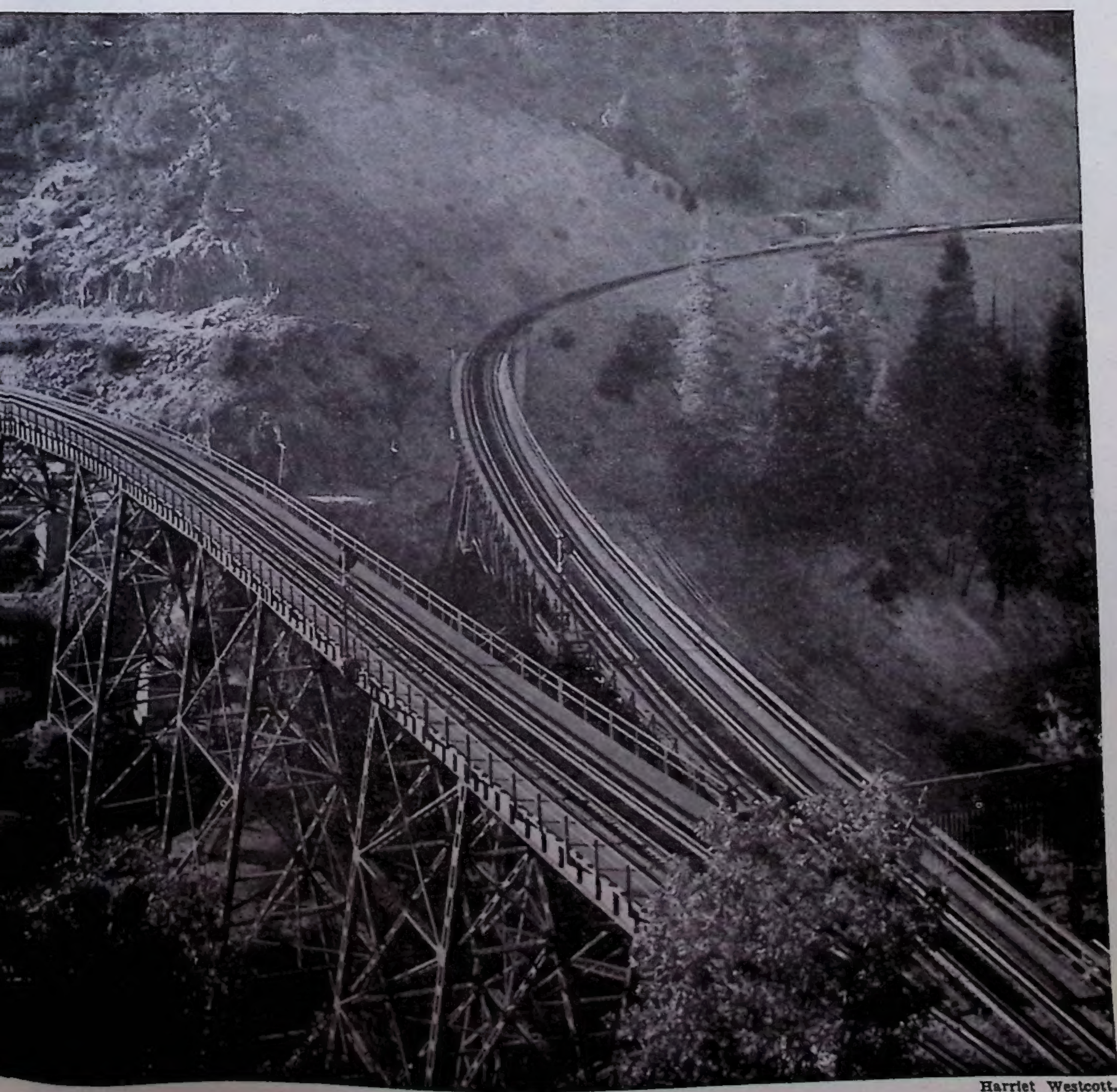
It took the war, however, to bring out the full potentialities of the Bieber Line. In the hectic days following Pearl Harbor its

* The author gratefully acknowledges the assistance of Thomas P. Brown, publicity manager of the Western Pacific, in obtaining certain historic data.

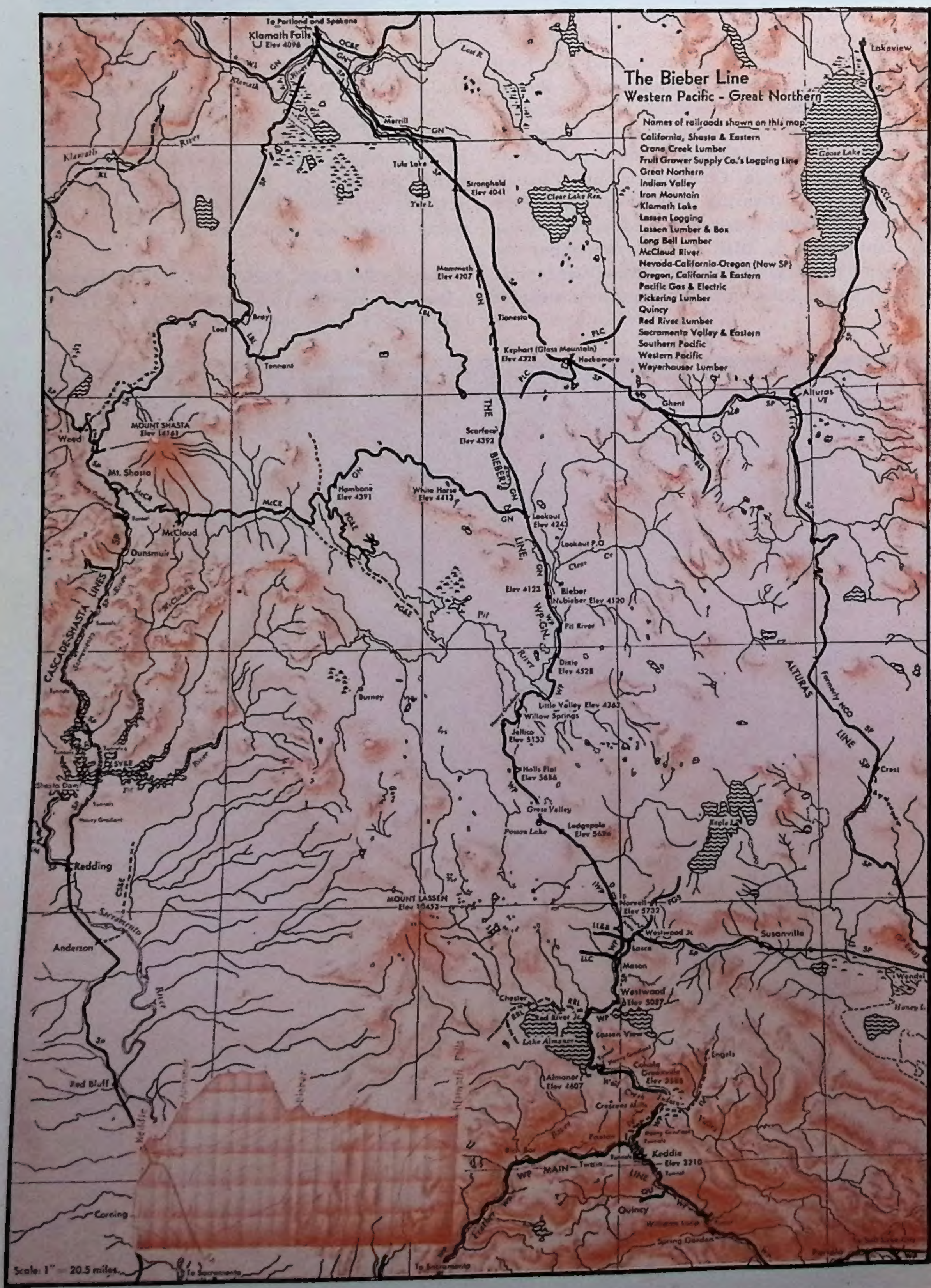
importance as a north-south military route was immediately substantiated. In fact, one of the arguments presented for its construction was this very use. Its route and the Great Northern extension up through eastern Oregon lie inland behind the backbone of the Cascade Mountains, safe from enemy coastal missions.

Permission to build was granted by the Interstate Commerce Commission on June 9, 1930, and the entire line was completed by the contractors working between Keddie and Bieber by November 1, 1931. I well remember the speed of construction across Grass Valley near Poison Lake. From my camp nearby I watched the railhead move across the valley with unbelievable speed. At sunrise nothing was to be seen in the broad grass and sage flat but grazing antelope and a few range cows. By nightfall the construction train moved across the valley on rails. Where for weeks before I heard only the coyotes and the wind in the pines, I now heard the distant whistle of locomotives and experienced the same feeling the early western settlers must have felt when at last the iron horse caught up with them.

Near Keddie, Calif., the Bieber Line (left) branches from the Western Pacific's main line. Switch for wye is in a tunnel just outside picture.



Harriet Westcott.


The Bieber Line
Western Pacific - Great Northern
Names of railroads shown on this map.
California, Shasta & Eastern
Crane Creek Lumber
Fruit Grower Supply Co.'s Logging Line
Great Northern
Indian Valley
Iron Mountain
Klamath Lake
Lassen Logging
Lassen Lumber & Box
Long Bell Lumber
McCloud River
Nevada-California-Oregon (Now SP)
Oregon, California & Eastern
Pacific Gas & Electric
Pickering Lumber
Quincy
Red River Lumber
Sacramento Valley & Eastern
Southern Pacific
Western Pacific
Weyerhauser Lumber
To Portland and Spokane
Klamath Falls
Elev 4096
Lakeview
Merrill
Tule Lake
Stronghold
Elev 4041
Clear Lake Res.
Goose Lake
Mammoth
Elev 4207
Bray
Leal
Tionesta
Tennant
Kephart (Glass Mountain)
Elev 4328
Hackamore
Alturas
Ghent
Weed
MOUNT SHASTA
Elev 14161
Mt. Shasta
Scarface
Elev 4392
Hambone
Elev 4391
White Horse
Elev 4413
Lookout
Elev 4245
Lookout P.O.
McCloud
Dunsmuir
Elev 4123
Bieber
Nubieber Elev 4120
Pit River
Dixie
Elev 4528
Burney
Little Valley Elev 4263
Willow Springs
Jellico
Elev 5133
Crest
Halls Flat
Elev 5686
Grass Valley
Poison Lake
Ledgepole
Elev 5626
Eagle L.
Redding
MOUNT LASSEN
Elev 10457
Norvell
Elev 5732
Westwood Jc.
Susanville
Anderson
Lassen
Mason
Westwood
Elev 5087
Wendel
Chester
Red River Jc.
Lassen View
Lake Almanor
Engels
Red Bluff
Almanor
Elev 4607
Calpine
Greenville
Elev 3585
Keddie
Elev 3210
Quincy
Corning
Spring Garden
Scale: 1" = 20.5 miles
To Sacramento
CASCADE-SHASTA LINES
ALTURAS LINE
Formerly NCO
THE BIEBER LINE

Beginning at the famous Keddie wye, the Bieber Line hacks its way out of a maze of deep twisting canyons and towering forested ridges by means of a series of spectacular rock ledges, tunnels and viaducts which threaten to overshadow their counterparts on the WP's main line through the Feather River Canyon, long a tribute to engineering skill. To the layman the route northward out of Keddie seems torturous and breath-taking, but in reality it is a succession of broad sweeping curves of well-kept roadbed which permits the long freight trains to move with remarkable swiftness and ease.

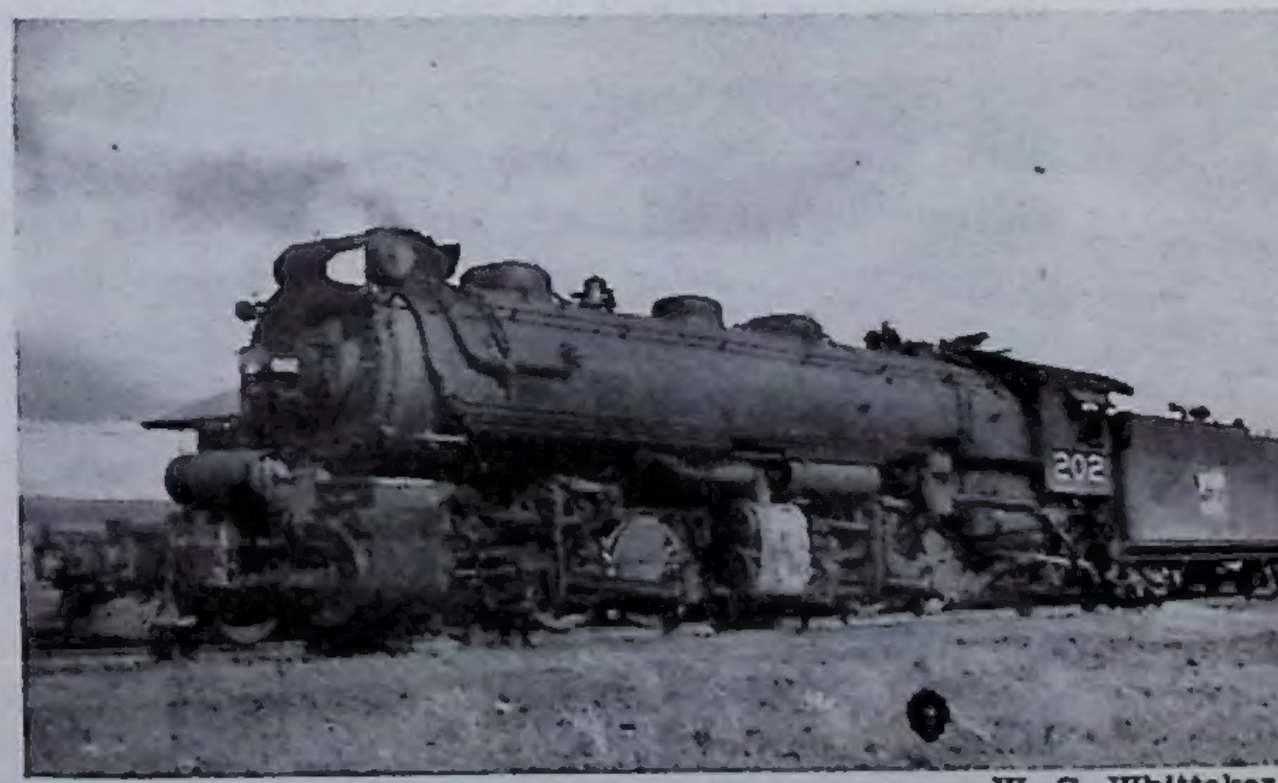
At Crescent Mills, eight miles north of Keddie, the line levels off and for a few miles skirts Indian Valley, a delightful expanse of mountain meadow and the namesake of the defunct Indian Valley Railroad. From Greenville, at the upper end of the valley, the line winds up Wolf Creek on a 2.2 per cent grade for nine miles to Almanor. Unlike the precipitous rocky slopes of Spanish and Indian creeks north of Keddie, the grade between Greenville and Almanor is gentler, of soil and gravel formations covered with virgin forests of Douglas fir and ponderosa pine.

Turning north, the rails skirt the eastern shore of Lake Almanor to Clear Creek Junction (formerly Red River Junction). Contact is made here with the newly organized Almanor Railroad, a lumber line which utilizes the former electrified portion of the Red River Lumber Company logging line to Chester. From Clear Creek Junction to Westwood, four miles, the Bieber Line until recently was operated as joint trackage with the Red River Lumber Company. The latter used electric locomotives over this stretch, which was strung with side catenary for the offset pantographs.

Between Westwood and Mason Junction, joint trackage is again used, this time with the Southern Pacific's Susanville-Westwood line. From Westwood, Milepost 39, to Bieber, Milepost 112, the route traverses a high plateau country made up of rolling timbered volcanic buttes and vast

Hugh Dougherty, 442 Superior Ave., San Leandro, Calif.

W. C. Whittaker, 166 Embarcadero, San Francisco, Calif.


W. C. Whittaker

W. C. Whittak

At right, from top to bottom: one of the Consolidations used in log trains. Bieber, Calif., where Great Northern rails connect with the Western Pacific. No. 202, one of the light articulated 2-6-6-2 Mallet compound locomotives which handle most of the traffic on the Bieber Line. The double-headed log train at bottom was photographed at McCloud. Map on opposite page shows route of the Bieber Line.

Philip C. Johnson, 341 Giannini Hall, University of California, Berkeley 4, Calif.
Logs from Red River Lumber Company operations in the Lassen National Forest en route to mills at Westwood on the Bieber Line, with a WP Consolidation at the head end.

open flats of grass and sagebrush. What this section lacks in the rugged grandeur found along the southern end of the line, it makes up for in its lonely wilderness. This is the Peter Lassen country, still marked by the trails of the early migrants who followed the intrepid explorer, and still pervaded by the silence of uninhabited places — country frequented by roaming herds of pronghorned antelope, where the high-pitched voice of the coyote nightly goes unchallenged except for an occasional distant whistle of a WP Mallet.

At the northern end of the plateau is Halls Flat Station, the operating summit of the Bieber Line. From an elevation here of 5700 feet the line drops rapidly on a 1.8 per cent grade for 15 miles to Little Valley, then continues into the juniper-covered foothills south of Bieber. From the Pit River Viaduct at the foot of the last descent the line levels off for the last few miles into Bieber, a small community of typical western ranches.

Throughout its length the Bieber Line is designed for the rapid movement of heavy freight. This has been done by the liberal use of deep cuts and fills and solid rock tunnels and by long tangents in the plateau country between Westwood and Halls Flat. The roadbed is well maintained with heavy rock and lava cinder ballast, and the last of the original 85-pound rail is being relaid with 112-pound rail.

Officially, the Bieber Line is operated as the Fourth Subdivision of the WP's Western Division. In practice it is not a branch line but a separate main line. Motive power assigned to the Keddie-Bieber run is anything but the venerable teapots found on most branch lines. Just about every freight that has rolled a wheel over the Bieber Line has been pulled by a brace of light 2-6-6-2 Mallet compounds of the 201 and 206 classes. These are comparatively light engines of 80,000 pounds tractive force, built by Alco in 1917 and 1924. They have been used on the Bieber Line almost exclusively since the line was built, being sort of midwives at its birth and hauling the long ballast trains surefootedly over the skeleton track. The second engine is cut in from 10 to 15 cars back of the lead engine and with this power the long freights move at a lively clip over the entire line, aided

only at each end by helpers of the same class cut in ahead of the bay-window caboose. Helper service is usually maintained for northbound drags between Keddie and Almanor and for southbound freights between Bieber and Halls Flat.

Lighter engines are ruled off the Bieber Line on through freight runs because of the heavy trains and the adverse grades, and the big 2-8-8-2's used in the Feather River mainline runs have heretofore been unable to negotiate the lighter rail of the branch. This has theoretically limited the traffic to what can be handled by the 10 Mallets normally used on the Bieber run. Occasionally, when traffic piles up, the new Diesel-electric freight engines are moved to the line, where they perform admirably. Tonnage freights normally requiring four of the 201-class Mallets for the 30-mile climb between Bieber and Halls Flat can be handled easily by the big Diesel road engines with only a Mallet on the hind end to ease the drawbar strain. In October, 1943, a bad smash-up laid up two of the 2-6-6-2's, and Diesels not only worked with the wrecker to clear the wreckage but helped to keep the wheels rolling after the line was reopened.

Normally, no small freights are operated over the Bieber Line, and motive power other than the light Mallets is seldom seen except in work trains. Since 1942, however, the Red River Lumber Company has operated large logging camps in the vicinity of Halls Flat with a network of logging-railroad trackage radiating from this point. Long trains of logs are assembled daily for movement over the line to Westwood. The lumber company's own motive power is occasionally used for this service but usually the log trains are handled by WP 2-8-0's.

Passenger service also came to the Bieber Line for the first time with the advent of the logging camps. Poor roads in the spring and late autumn were chiefly responsible for the *Logger's Special,* a once-a-week round-trip run from Halls Flat to Westwood to accommodate lumber company personnel spending weekends in Westwood. The train is made up of former Sacramento Northern Railway steel multiple-unit trailers pulled by one of the Con-

A southbound drag picks up momentum as it crosses the Pit River viaduct headed for the 30-mile climb to Halls Flat. The 70 cars in this train are handled by four Mallet compounds, two of which are visible.

Philip C. Johnson.

Philip C. Johnson.

The Feather River Canyon, w the Western Pacific's main line left and the Bieber Line in distance at right. This scene near Keddie. At left, Extra South picks up speed as it lea Halls Flat for a fast run to We wood behind a Diesel locomoti

solidations usually assigned the log runs. Outside of casional C. C. C. specials a Oakland-to-Norvell Flat wi ter snowball specials, no oth passenger trains have been o erated over the Bieber Lin

When the line was first built it was rumor that Jim Hill's *Empire Builder* would ride t Bieber Line right into Frisco Bay, but the d pression apparently stopped even the rum The Bieber Line, together with the Gre Northern's extension up through Oregon, well situated to handle passenger service on competitive basis between Portland-Spoka and San Francisco, and the time may yet co when passengers may view the scenic wonde of the Deschutes Canyon in Oregon or the M doc lava beds, Mount Lassen and the scen Almanor country in northern California as th speed along in GN-WP passenger trains.

The Bieber Line has earned its way alm from the day the line was opened to traffic. 1932, the first full year of operation, revenue the Western Pacific from freight traffic util

Can you name the railroads?

Below is a list of name trains. Can you identify the railroads to which they belong? Answers on page 42.

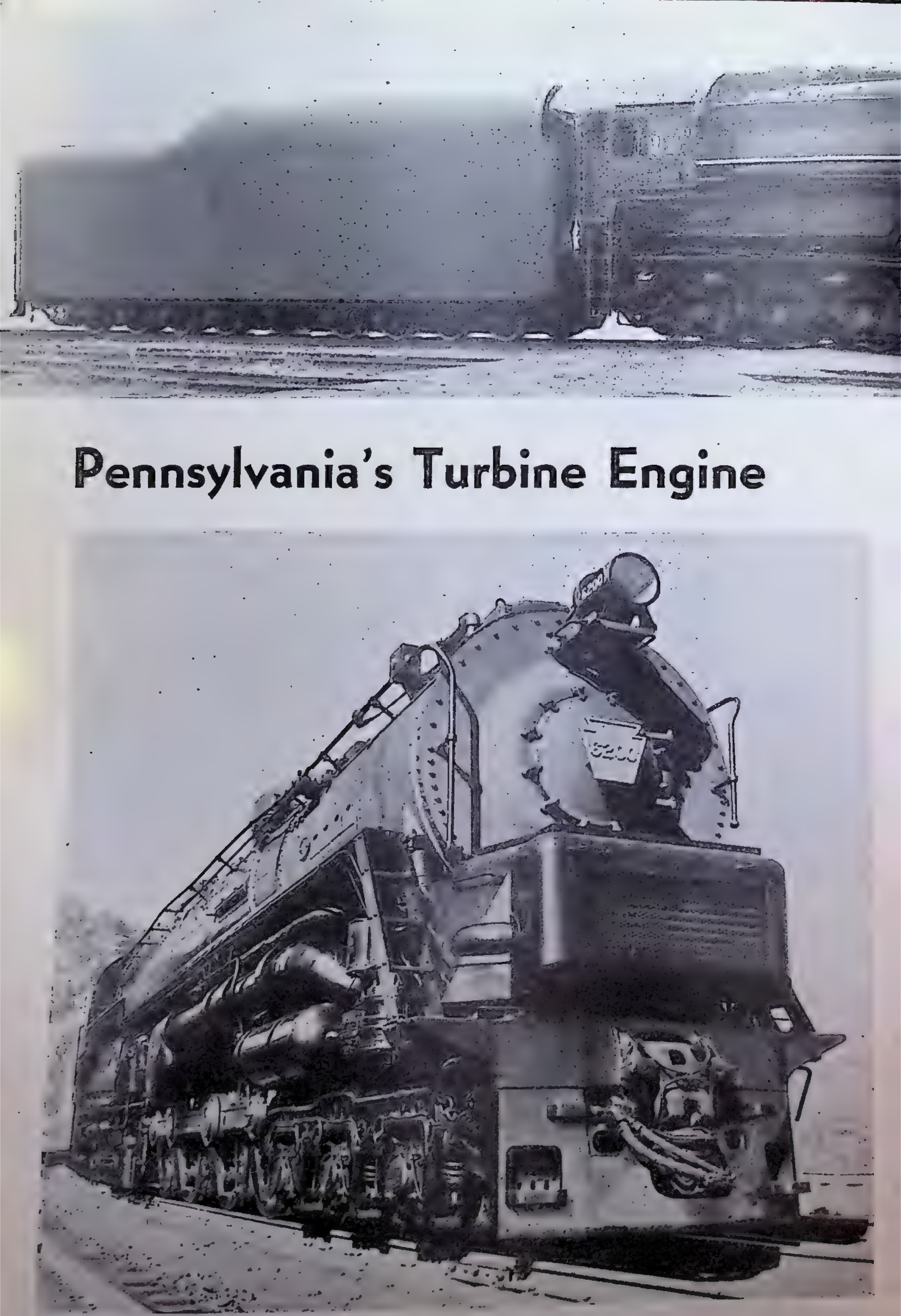
1. Exposition Flyer ----------
2. Broadway Limited ----------
3. The Pacemaker ----------
4. Rocky Mountain Rocket ----------
5. Pioneer Limited ----------
6. Capitol Limited ----------
7. Azalean ----------
8. Zipper ----------
9. Seminole ----------
10. Bluebird ----------
11. Tennessean ----------
12. Southerner ----------
13. Sunset Limited ----------
14. Meteor ----------
15. North Country Mail ----------

ing this route amounted to over $1,200,000 or 13 per cent of the company's total revenue. Since then returns have steadily increased to rapidly amortize the $10,000,000 construction costs of the Keddie-Bieber portion of the line. It was this revenue which helped pull the WP out of the red and make it into the really fine Classs 1 road it is today.

Together with its GN counterpart, the Bieber Line has been a successful venture largely because it is a vital bridge between two prosperous sections of the country and because its planners had the foresight to capitalize on the potential local traffic. Not the least important, it has broken the Southern Pacific's tight monopoly of rail traffic between the Pacific Northwest and California. At the moment, the Bieber Line is literally snowed under with wartime traffic; but by this very fact it has shown itself to be one of the Pacific Coast's great traffic arteries. It has demonstrated, too, how successful cooperation and reciprocity can be between two great independent railroad systems.

No. 203, one of five 201-class Mallet compounds used on the Bieber Line exclusively, is equipped with a snowplow pilot during the winter months and is used as a lead engine. Plows are removed in summer. Below, the Bieber Line's only passenger train makes a once-a-week round trip between Halls Flat and Westwood. Former Sacramento Northern steel M. U. trailers are used for the run.

Philip C. Johnson.



Pennsylvania's Turbine Engine

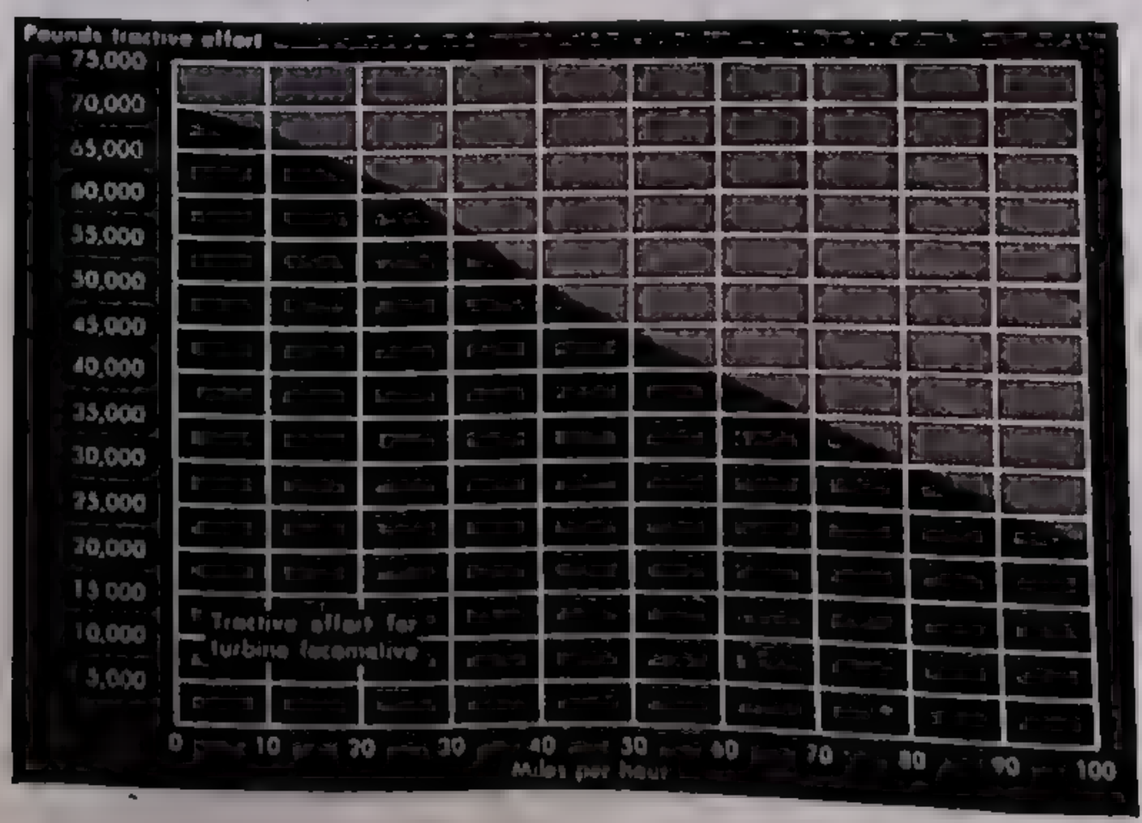
Side view, before lettering, of the Pennsylvania's new direct-drive steam turbine locomotive, built by Baldwin Locomotive Works and Westinghouse Electric & Manufacturing Company in collaboration with the railroad.

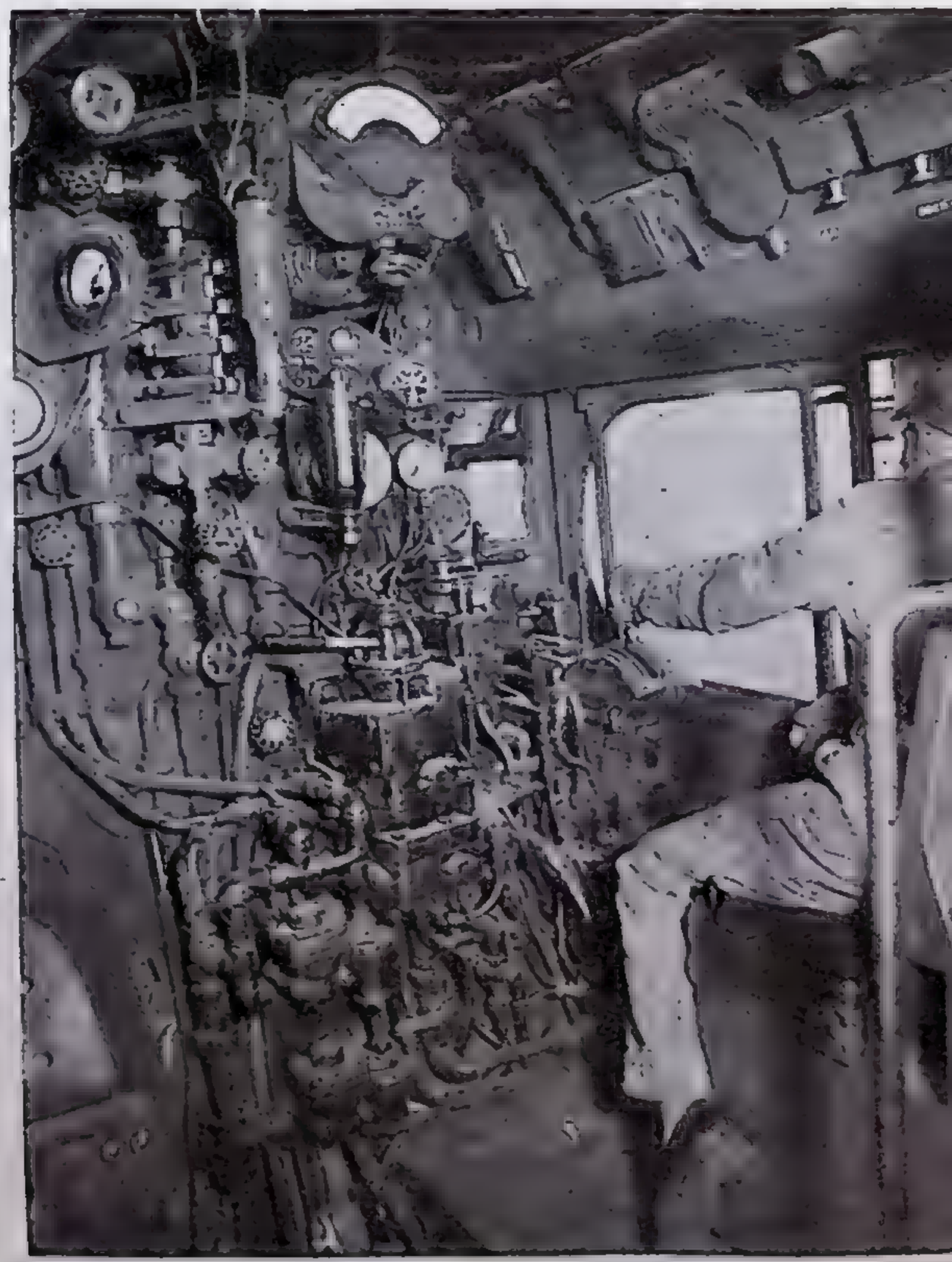
THE Pennsylvania Railroad has placed in experimental service on the Middle Division its new Class S-2 direct-drive steam turbine locomotive, a fundamentally new type of coal-burning motive power producing tractive effort by a steam turbine geared directly to the two center pairs of 68-inch drivers, thus doing away with the reciprocating parts of the conventional engine. The resulting torque is constant and, since the revolving weights can be fully counterbalanced, the locomotive is very easy on the track.

Two turbines are used: a forward turbine of 6900 shaft horsepower, two impulse and five reaction stages, and a reverse turbine of 1800 horsepower. The forward turbine is permanently in gear with the center axles through a quill arrangement similar to that used on electric locomotives. Gear ratio is 18½:1, and the maximum operating speed of the turbine is 9000 r. p. m. The reverse turbine can be thrown in and out of gear by a pneumatic arrangement.

Boiler pressure is 310 pounds; exhaust pressure, 15 pounds. While the horsepower at high speeds is limited by the steam generating capacity of the boiler, the turbine not only creates less track pound, but will also effect some economy in the use of steam. Power is sufficient to pull full-length passenger trains at 100 miles per hour. The boiler is of modified Belpaire design, fitted with a 120″ x 96″ fire box. The combustion chamber is 120 inches long. Evaporative heating surface is 4992 square feet and superheating surface is 2050 square feet.

One of the greatest problems in the design of this type of locomotive is the metallurgy of the gears which must transmit the enormous torque of 6900 horsepower. In an electric locomotive this same horsepower would be divided between a number of motors and gear sets. Another problem was the smooth control of steam into the turbine.





The graph at left shows the tractive effort at various speeds for the Pennsylvania's turbine locomotive. Photo above shows the engineer using the single control lever which when pushed forward controls the throttle for the forward (right side) turbine and when pulled back not only feeds steam to the reverse turbine but puts it in gear.

The Great American Railroad

BY ROBERT S. HENRY

Our many systems work together to furnish nationwide transportation service, unified and efficient

The most dramatic thing about railroads in America is not the flashing streamlined train, nor even the mighty freight locomotive, but the fact that any freight car of any railroad can be, and is, moved in the trains of any other one of nearly 700 operating railroads. This free and virtually unlimited interchange of freight cars opens to producers all over the country the widest possible range of markets, and makes available to consumers the widest possible range of choice in sources of supply. Because of it, commerce in America has taken on a continental character.

Back of this overwhelmingly important fact is cooperation and coordination which is so well organized and established, and which works so nearly automatically, that it has largely escaped attention.

Every day, shippers load from 100,000 to 150,000 cars with freight. They are loaded not only at railroad freight houses and team tracks but at factory sidings, on mine spurs, at industry tracks—at probably a million or more separate locations scattered all over this continent. Every day, these cars are gathered up by railroad switch engines and assembled into trains, for mass movement between terminals. Every day, they are switched out of trains at way stations, or are classified and distributed at terminals for delivery to connections or for spotting on industry tracks or at freight houses or team tracks to be unloaded or reloaded. The truly remarkable fact about this daily performance is that any and every one of these cars, as long as it complies with the interchange rules of the Association of American Railroads, can go anywhere on the nearly 500,000 miles of tracks of the standard-gauge railroad systems of the United States, Canada, Mexico and Cuba.

The physical standardization behind that fact is itself remarkable, but no more so than the cooperative commercial arrangements established and agreed to by all railroads which permit this daily flood of commerce to move from railroad to railroad as a matter of routine, and without special consideration.

This standardization and these commercial arrangements were achieved by railroad men out of their own experience and, in essentials, with no compulsion other than the compelling needs of commerce. In their nature, and in the way in which they were brought into being, they constitute one of the finest of all stories of effective commercial cooperation for better service and lower costs. Individual men and separate companies worked together to achieve the freight train made up of the cars of many companies, which is as distinctive and as fine a symbol as we have of American unity.

First, there is the track. Tracks have been built in America of all gauges from two feet to six. At the time of the War Between the States, there were in Confederate territory alone as many as 11 different gauges, and in the whole country at least 17. Nowhere did a railroad bridge cross the Ohio or the Potomac River, where those streams were the unofficial boundaries between sections. Nor was there great need of one, because where railroads reached those streams from the North and the South they were of different gauges.

No attempt was made during the war to change the gauge of the southern lines, for there was as yet no standard in the North. Equipment sent south by the Union armies was changed, where necessary, to fit the southern tracks. But in the North the demand for through freight service in cars which did not have to be unloaded and reloaded where gauges "broke" was exerting a powerful pressure toward standardization.

It was already possible before 1860 for a car of six-foot gauge to run from the Hudson to the Mississippi at St. Louis. Between the Atlantic and the Great Lakes at Chicago, however, there were three separate gauges, ranging from 4′-8½″ to 4′-10″. To enable freight to run through from Chicago to the East over these tracks of varying widths, a wide-tread wheel was devised, with its inner edge narrow enough to run on the 4′-8½″ track, and its

outer edge broad enough to ride the 4′-10″ rails.

The success of these through freight lines pointed the way toward complete standardization and outright interchangeability of cars. By 1886, although there were a few narrow-gauge lines, as there are today, the country had arrived at a "double" standard—in the North and West, 4′-8½″; in most of the South, 5′-10″. In that year, the final standardization was accomplished in the remarkable feat of bringing the southern gauge down to the narrower standard with no appreciable interruption of traffic. It is worth noting that this complete standardization, accomplished in the United States in 1886, was not achieved on the island of Great Britain until 1892, *and has been achieved in no other continent in the world to this day.*

The 1880's were the great decade for physical standardization of American railroads, to make possible the wide and unbroken flow of freight cars. Standard time became an accomplished fact in that decade, as did the air brake for freight trains and the standard automatic safety couplers—all three worked out by cooperation among railroads, and all three put into use, as far as most roads were concerned, without compulsion of statute law. The final and complete adoption of power brakes and safety couplers by all roads, it is true, came only after legislative action, but standard time was maintained purely by force of railroad adoption, without Congressional action, for 35 years until the First World War.

During the half century since these essentials of interchangeable freight-car service were established, vast advances have been made in details of couplers, brakes, draft gear, wheels, and, indeed, of all essential parts of the underframes and running gear of cars. The most recent change to be completely accomplished was

Cars from all parts of America are gathered into trains—and they all couple together, brake together, and run together. Even the ladders, steps, and hand brakes are always in the same places.

Courtesy Chicago & North Western.

the replacement of the old arch-bar trucks by those with cast-steel side frames—a great safety improvement devised, put into effect and made universal in application by action of the railroads themselves.

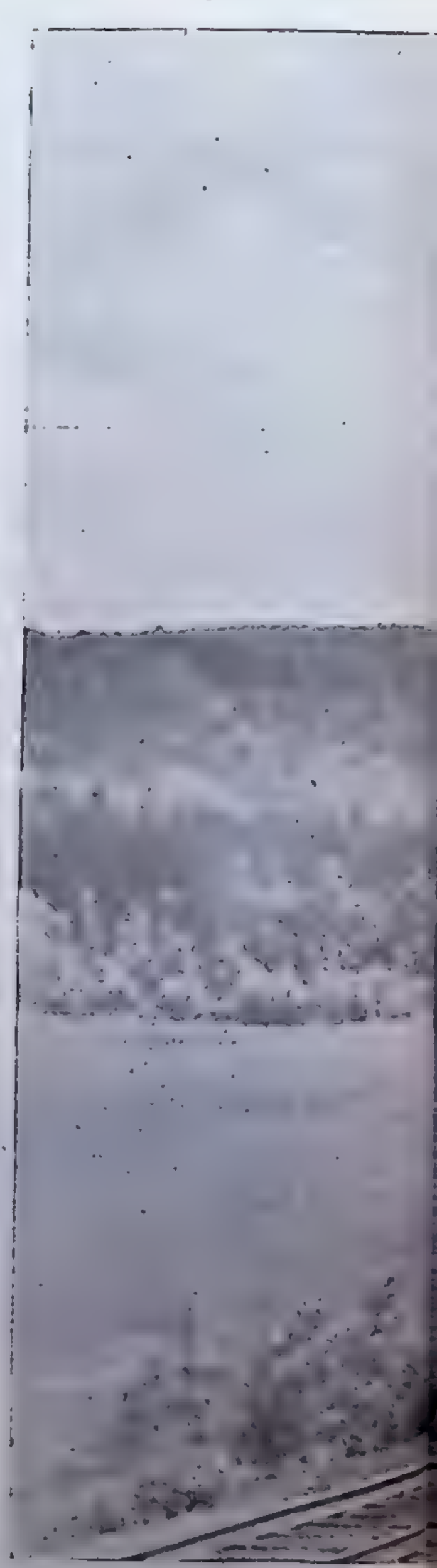
Through all the steady progress of these decades the continuing idea has been gradual changeover from old to new as the new has been found ready to meet the tests of reliability required in railroad operation, all the while maintaining unimpaired the principle of standardized interchangeability. The new, however good it might seem, could not come into use unless during the period of transition it could work right along with the old.

This principle is essential to the maintenance of the widest interchangeability of freight cars. Each railroad decides upon its own standards as to the strength of bridges, and curvature and grades of its track, the nature of its construction, and the types and designs of locomotives which it runs over its track. Track and bridges are built to fit each road's needs, and locomotives are tailored to fit the track and bridges. But with freight cars it is different. They are built to standards agreed upon and accepted by all railroads, so that any car which meets the A. A. R. interchange standards can go anywhere, in any train.

Developing on a parallel course with this physical standardization have been the commercial arrangements necessary for interchange of cars among railroads. These include arrangements to get cars "home" from "foreign" lines; to keep them in repair while away from "home"; to account and pay for the use of cars, including the cost of running repairs; and to make joint through rates, collect the rates and charges as published, and distribute the proceeds among the railroads performing the service according to the divisions agreed upon.

All these it takes, besides a standard gauge of track and a standard car, to maintain the unbroken flow of freight by rail into every corner of the continent.

Owning a freight car costs money—the interest on the capital invested in building or buying it, the cost of its maintenance and periodic overhaul, the depreciation which goes on every day of its life whether running or standing, loaded or empty. And so, when joint use of cars for through hauls began, there immediately arose the problem of reimbursing the owner of the car for its use by other lines. The earliest method of payment was by the mile, but this failed to work out because of the necessarily seasonal and fluctuating nature of railroad traffic. When payment was made only for miles run, a railroad might accumulate its neighbors' cars and hold them to protect its own traffic peaks, without cost to itself. The per-diem system was substituted, therefore, starting in 1902 at 20 cents per day. Payments at present, and for some years past, have been set at $1 per day. This sum, calculated to be approximately the average cost of owning a freight car, is paid to the owning road by the road on which a car is at midnight of each day, whether the car is empty or under load and regardless of the mileage run. Determination of per-diem questions is in the hands of the operating-transportation division of the A. A. R.



Per-diem payments, however, are not a sufficient means to cause cars to flow "home" automatically, in times of active demand. Nor could the system operate to marshal the great fleets of cars needed for peak loads such as the movement of a major crop. Those results are accomplished by the car service rules, agreed to by all railroads and administered by the car service division of the A. A. R. Cars made empty are supposed to be, and usually are, started back to or toward their owners, loaded

H. W. Pontin, Railroad Photographic Club, 47 Royal St., Allston, Mass.

The freight train is a symbol of American industrial efficiency. It is transportation on a production-line basis, carloads from here and there, all moving together with one engine and one crew.

if a load going in that direction is available, empty if not. This is the automatic feature of keeping cars distributed in accordance with the ordinary needs of commerce.

But when extraordinary demands arise, as they do at harvest time or in time of flood or great emergency such as war movements, the car service division has power to meet the need either by speeding up the home flow of cars to particular areas or to particular railroads, or by turning cars of any ownership to the task at hand. Thus, for example, the car service division might be directing the movement of Class A box cars from the East to the West to meet the demands of the wheat crops, and at the same time be directing the movement of gondolas and other open-tops from the West to the East to meet the demands of the coal, ore and steel movements, and be moving stock cars from the West to the South to help get the watermelons to market. The division's steady, everyday job, however, is keeping check on the

regular return of cars of all types to their home roads, as a means of maintaining the distribution of cars which most nearly meets ordinary traffic demands.

Each railroad reports cars of other roads received and forwarded, and in turn receives like reports from all other railroads as to its own cars. For each day it has a "foreign" car on its tracks, a railroad owes the owner $1. For each of its own cars away from "home" it is due to receive $1 a day. Settlement is made between roads periodically, on the net balance due according to their records.

But the mere settlement of car-hire balances does not square the account between railroads, for cars, even the best of them, have a disconcerting way of going "bad order" away from home as well as at home, and if commerce is to keep moving they must be repaired and kept rolling. Ordinarily, where there is no special responsibility on the part of the road on which the car gets out of repair, the cost of making repairs, made in a standard way with standard parts and at a scale of standard costs, is charged to and paid by the owning road. Where there is negligence or responsibility on the part of the using road, the repairs are made at its expense. Borderline cases are handled by agreement, or, where no agreement is reached, through the arbitration machinery of the mechanical division of the A. A. R.

Besides accounting for the use and care of the wandering freight car, there must also be arrangements to account for the revenue the car earns carrying freight in joint and through service. Through rates, ordinarily, are divided by agreements worked out by the traffic departments of the roads concerned, and set out in "division sheets." Considering the almost inconceivable number of rates published, and the almost infinite number of possible divisions, no effort is made to state each rate and its proportionate divisions, but rather to establish a set of general factors to apply in dividing revenues. Where railroads do not agree, either may submit the matter to the Interstate Commerce Commission in a divisions case, or the commission itself may—as it did in the case of the divisions going to the New England roads—take up the subject in one of its own general investigations. The divisions agreed upon by the railroads or established by the I. C. C. are applied through the accounting department of the railroads. There, again, exists a means for adjusting borderline and doubtful cases through the machinery of the accounting division of the A. A. R.

But still other possibilities are to be dealt with. Every joint-line freight shipment produces revenue and, unfortunately, not a few of them give rise to claims for loss and damage. These claims are filed with either the originating or the delivering railroad, which investigates, adjusts and settles them for the account of all the lines concerned, and prorates the cost among them. Here, again, is occasional need for adjustment among the railroads which pay the bills. This is accomplished through the arbitration procedures maintained by the freight claim division of the A. A. R. These several arbitration understandings among the railroads, indeed, are among the oldest, most widely used and most generally successful applications of the principle and practice of commercial arbitration.

All this, and more, is back of the seemingly simple fact that a freight car of any railroad may be seen trundling along in the trains of any other railroad—with all which that means in the national unity, the continental commerce and the daily life of North America.

Courtesy Chicago & North Western.

Count the road names! The variety of cars in any freight yard (this is C&NW's Proviso Yard at Chicago) is so commonplace that we take it for granted; and yet it is a symbol of our most vitally important industrial fact, universal heavy freight service.

Exchanging the Tables

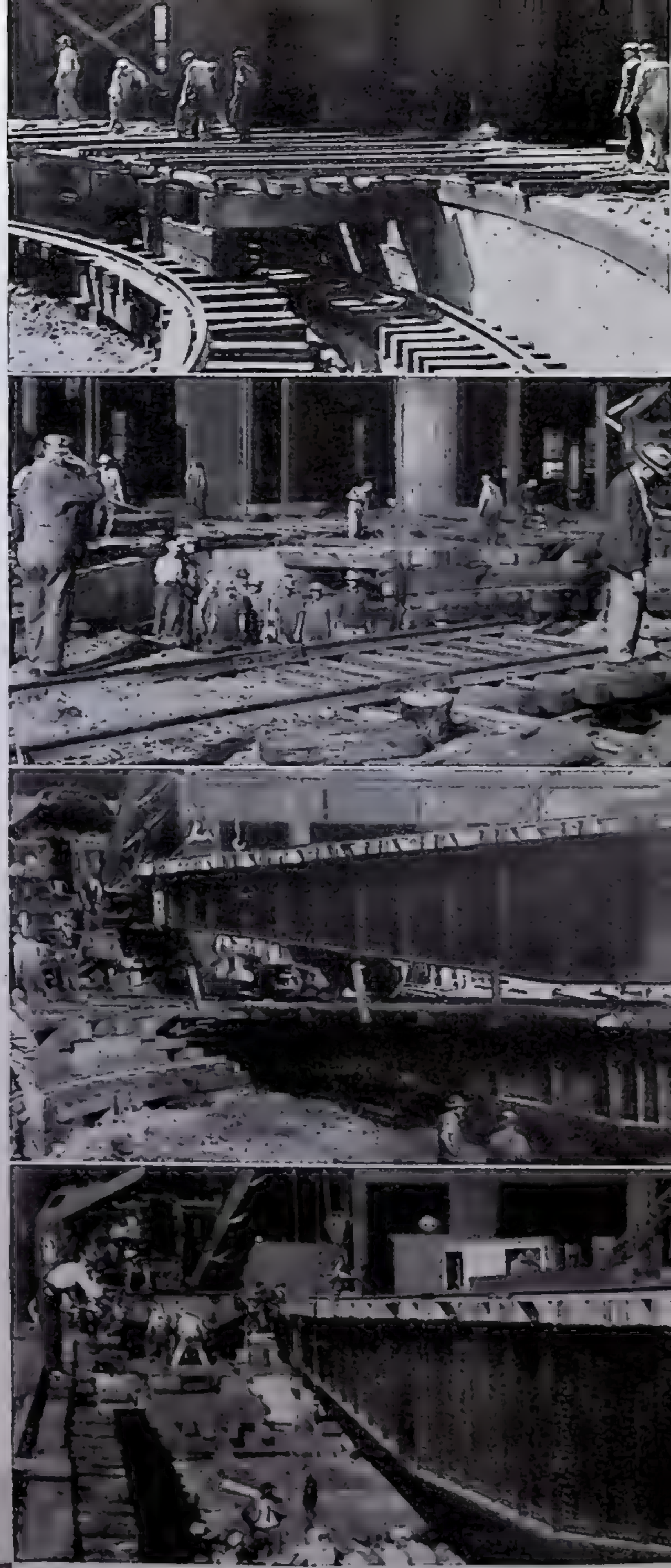
For many years an 80-foot turntable was sufficiently large to handle the types of locomotives running into the B&O terminal at Chillicothe, O. But lately the railroad found it to be inadequate, and decided to replace it with a 100-foot table. To replace a turntable at a busy division point is a man-size job. It requires a lot of preliminary work and planning, and, for the actual change, a carefully worked-out schedule wherein everything is timed to the minute.

The operation at Chillecothe was similar to the plans used at other places. Months before the larger table was ready to be placed, surveys were made, test drillings made of the soil under the foundation of the pit, drawings made, materials assembled, and a rebuilt table shipped from Martinsburg, W. Va.

As the new table had greater depth than the old one, it was necessary to deepen the pit as well as to widen it. Timbers and steel girders were used to brace up and carry the weight of the center casting of the old table, so that the granite slab which was used as a foundation for the new center casting could be placed in position directly under the old one.

As the pit was widened and a new retaining wall built, the tracks leading to the old table had to have a timber understructure built to support them. Then the ties and rails for the new circular track in the pit were placed.

All of the preliminary work having been completed, the day for the change arrived. The "doings" were scheduled to start at 7 a. m., and all locomotives that would be needed during the next 10 hours or so were spotted on nearby tracks. How the work proceeded is shown in the accompanying photographs and captions.



All photos courtesy Baltimore & Ohio.

Top photo shows the temporary arrangement of tracks at edge of enlarged turntable pit with old turntable still in use. The next view shows crew cutting off rails at new edge of pit and removing temporary cribbing. Next, the two wrecking cranes lift the new table off trucks. In the bottom photo the old table has been hoisted to one side and the new one is almost in position, while workmen place the new center casting. To right is the new table ready for use, just eight hours after the top photo was taken!

Southern Railroad Engine 3859 at Selma, Ala.

The Southern's 4-4-0 No. 3859 was built i
Virginia & Georgia, which was acquired

W. H. Thrall Jr., 5839 Montebello Pkwy., Los Angeles 22, Calif.

1880's for the East Tennessee, Southern in 1894. When this photo was made in September, 1938, she was just out of the paint shop and was pulling passengers between Selma and Mobile, Ala. She was scrapped in 1940.

The Delaware & Hudson

Anthracite and bituminous coal make up the greater portion of tonnage on 848-mile eastern line

BY W. T. CONIFF

It is less than 400 miles as the crow flies from Wilkes-Barre, in the heart of the bleak, breaker-crowned hills of Pennsylvania's northern anthracite field, to Rouses Point, N. Y., neat little border town on the Canadian boundary line. In the rugged country between, over the Moosic and Catskill mountains and a dozen lesser summits and along the valley of the upper Hudson River and the western shore of historic Lake Champlain, the Delaware & Hudson Railroad has threaded its 848 miles of line into one of America's great transportation systems.

The railroad is operated in three divisions: the Saratoga & Champlain, the Susquehanna, and the Pennsylvania. Most of the passenger operation and no small amount of freight traffic is handled on the Champlain & Saratoga Division from Albany to Rouses Point, 190 miles. Over this run the *Laurentian* and the all-Pullman *Montreal Limited*, the finest and fastest trains between New York and Montreal. They run via New York Central from New York to Albany, then via D&H's Champlain & Saratoga Division to Rouses Point, where they are turned over to the Napierville Junction Railway, a D&H subsidiary operating in Canada.

Both southern divisions are predominantly freight railroads. The Pennsylvania Division, partly isolated from the rest of the railroad, connects Wilkes-Barre, Scranton and Carbondale in the anthracite bowl, then continues north to its junction with the Susquehanna Division at Nineveh.

The anthracite bowl on the Pennsylvania Division might well be called the heart of the Delaware & Hudson—not because it is in the center of the system, for it is not. It is at the road's southern extremity; but it is from this bowl that anthracite, the life blood of the D&H, is pumped northward in trainloads. This is the greatest anthracite-producing region in the United States. More than 50 million gross tons were produced a year before the war and a fair share of this flowed northward on the Delaware & Hudson toward New England and Canadian points.

It was this same flow of coal which gave the Delaware & Hudson its birth. More than 120 years ago coal was dragged over the crest of Moosic Mountain to the east of Carbondale on horse-drawn sleds. At Lackawaxen, on the Delaware River, the coal was transferred to barges and floated down to Philadelphia. This was a tedious process and the market was restricted to points along the Delaware River. It was only natural that a canal should be built to improve the water-borne distribution, and rails were laid over Moosic Mountain because the canal could not be extended here. This project was built by the Delaware & Hudson Canal Co., chartered in 1823. By 1828 the railroad between Carbondale and Honesdale and the canal from Honesdale and the Delaware River to the Hudson at Rondout, near Kingston, were in operation. Coal was loaded into small cars at Carbondale and hoisted up inclines called planes to the top of Moosic Mountain by huge ropes, as much as eight inches in diameter. Loaded trains descending from the summit were attached to a cable around a drum which hoisted empty cars up the steep grade; a large windmill with blades three feet wide and eight feet long was

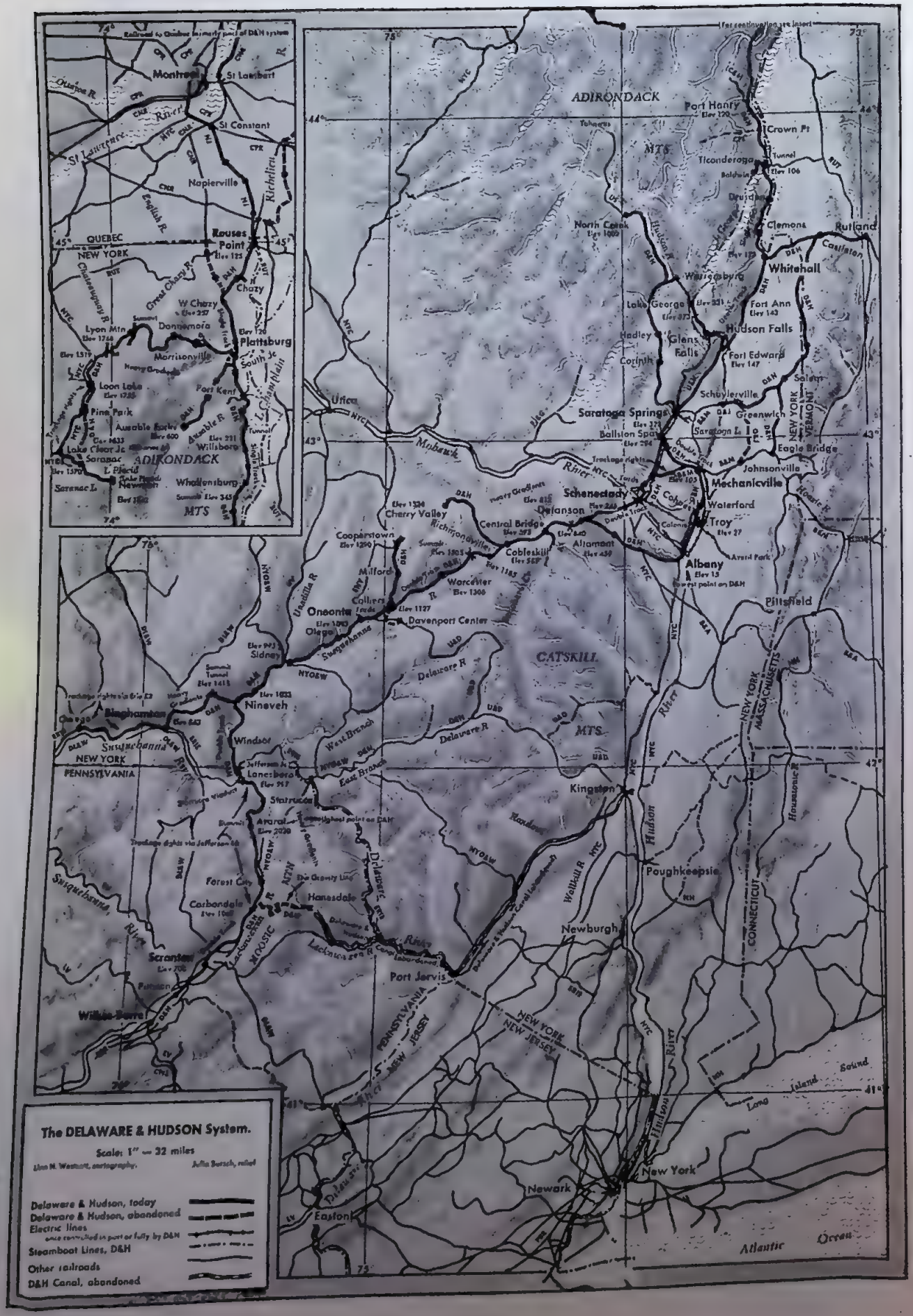
geared to the drum, adding its resistance to that imposed by the weight of the empty cars. With the drag of the ascending empties and the spinning arms of the windmill to help, one brakeman easily controlled descending trains to the foot of the steep hill. From here, cars were run by gravity or drawn by horses until they reached the canal head at Honesdale. With this new system, delivery could be made both toward Albany and toward New York City.

Soon a second track was added to make the return of the empty cars more flexible. These were pulled up by rope to high points along the sides of the valleys and then coasted down gradually descending track to the next rope incline. This process was repeated many times until the cars reached the summit, where they were let down to be refilled at the mines. In all there were about 30 rope planes. Years later this line was relocated sufficiently to allow operation by steam locomotives. This grandpa of the present D&H system is now entirely abandoned, even though the name Delaware & Hudson is still used by the company.

It was on this early railroad line that the first American operation of the steam locomotive was tried. The engineer, Horatio Allen, ordered two steam locomotives from England and the one known as *Stourbridge Lion* was tried out at Honesdale. The locomotive proved clumsy and was too heavy for the trestles, and commercial operation by steam over the gravity line was postponed until 1899.

But today's main line, though it runs in a different direction, still serves to transport coal out of the anthracite region. In 1942 more than half of the tonnage handled by the road was coal—10,047,045 tons of anthracite and 7,290,780 tons of bituminous, a total of 17,337,825 tons against the remaining 15,464,765 tons of other freight which made up the grand total of 32,-

Second Laurentian at twilight near Willsboro, N. Y. By H. W. Pontin, Railroad Photographic Club, 47 Royal St., Allston, Mass.


The DELAWARE & HUDSON System.
Scale: 1" = 32 miles
Delaware & Hudson, today
Delaware & Hudson, abandoned
Electric lines
Steamboat Lines, D&H
Other railroads
D&H Canal, abandoned
ADIRONDACK
MTS
CATSKILL
MTS
Montreal
St Lambert
St Constant
Napierville
Rouses Point
Chazy
W Chazy
Plattsburg
Lyon Mtn
Donnemora
Morrisonville
Loon Lake
Port Kent
Pine Park
Ausable Forks
Willsboro
Lake Clear Jc
Saranac
L Placid
Newman
Whallonsburg
QUEBEC
NEW YORK
Port Henry
Crown Pt
Ticonderoga
Clemons
Rutland
Whitehall
North Creek
Warrensburg
Lake George
Fort Ann
Hudson Falls
Hadley
Glens Falls
Corinth
Fort Edward
Salem
Schuylerville
Saratoga Springs
Greenwich
Ballston Spa
Eagle Bridge
Johnsonville
Mechanicville
Schenectady
Waterford
Troy
Albany
Cherry Valley
Central Bridge
Cobleskill
Altamont
Cooperstown
Milford
Worcester
Colliers
Oneonta
Davenport Center
Olego
Sidney
Nineveh
Binghamton
Windsor
Lanesboro
Statrucca
Ararat
Forest City
Carbondale
Hanesdale
Scranton
Wilkes-Barre
Port Jervis
Kingston
Poughkeepsie
Newburgh
New York
Newark
Easton
Pittsfield
Utica
Mohawk
Susquehanna
Delaware
Hudson
Atlantic Ocean
NEW YORK
PENNSYLVANIA
NEW JERSEY
MASSACHUSETTS
CONNECTICUT
VERMONT

802,590 tons moved during the year. The figures on freight-car-miles for 1940 graphically illustrate the inevitable unbalance produced by the traffic with lading of this nature. Northward, 88,310,000 loaded car-miles and 15,887,000 empty car-miles totaled 104,197,000 car-miles, while southbound loaded car-miles were only 44,000,000 and empty car-miles were a whopping 55,618,000 to total 99,618,000 southward car-miles.

Follow the coal that comes down out of the mine spurs in Pennsylvania. The mine runs gather it in, pulling out the loads and shoving back the empties at the tall, many-windowed coal breakers. The Hudson Coal Company, a D&H affiliate, with its 14 mines and six breakers, contributes more than 125,000 cars to the freight movement every year. With more than 650 miles of underground track and 275 electric mine locomotives and more than a thousand mules stabled underground to move its mine cars, the Hudson Coal Company is quite a railroad operation in its own right and employs 9000 men in its extensive workings. The Marvine Colliery in Scranton is typical of the modern plants that process hard coal, breaking, sizing, screening and cleaning it in a matter of minutes. The coal is fed into a huge inverted cone where a mixture of sand and water, constantly agitated, separates the fuel from the waste and impure materials by a flotation process. "Cone-cleaned D&H Coal" is the result, and long trains of it are assembled in Wilkes-barre, Scranton and Carbondale. Northward it must go to the markets, and out of Carbondale the stout old articulateds bellow up the hill behind the heavy trains. Often two of them are cut in ahead of the caboose, to buck a train up over Ararat Summit toward Lanesboro.

The D&H uses tracks owned by the Jefferson Railroad, an Erie subsidiary, from Carbondale to Jefferson Junction in Lanesboro. This part of the line—in fact most of the D&H south of Whitehall, N. Y.—is double-track. For several miles the main line climbs northward along the Lackawanna River, passes Ararat, and dives down Starucca Creek toward Lanesboro. Here it passes under the famous Starucca Viaduct of the Erie, then follows the Susquehanna into New York State and to Nineveh, the junction with the Susquehanna Division. This Pennsylvania Division is a tough-going line because it is almost all on a grade and the loads are heavy and frequent. Except in the mining area, there is no passenger service.

Traffic from the coal regions is augmented by merchandise freight picked up by interchange at Binghampton on the Susquehanna Division. The feeder roads at Binghamton are the Erie and the DL&W from the west, and the principle commodities picked up here are meat, raw materials and merchandise using the D&H as a bridge route to the B&M. As on all parts of the D&H main line, more loads go north and more empties south.

The traffic pattern of the D&H takes shape in Oneonta. Freight that funnels in with the long trains from the south and west is shuffled and shunted to resume its journey northward, bound either for Mechanicville, for connection with the B&M for New England, or for Whitehall, if consigned to northern points.

Trains for either destination follow the same route most of the way, continuing up the Susquehanna on a gradual grade to the summit four miles west of Richmondville, where the line rises just above 1500 feet to pass through a gap in a shoulder of the Catskill Mountains. The grades on either side of the summit are nearly two per cent, but the curves are gradual. Articulated power is often used on the 96-mile run over this summit to Mechanicville. The new Class K 300's or the old reliable 900's, which have been putting in their miles on the D&H for almost four decades, are most-used on the 135-mile run to Whitehall. Junkers with long trains and five or six thousand tons trailing them make a running test of their brakes before tackling the summit at East Worcester and then head down the hill while hurrying brakemen jump from car to car, turning up their retain-

Railroads indicated on the map

Boston & Albany
Boston & Maine
Brooklyn Cooperage
Canadian National
Canadian Pacific
Central of New Jersey
Crown Point Iron
Delaware, Lackawanna & Western
Delaware & Hudson
Delaware & Northern
Erie
Fonda, Johnstown & Gloversville
Greenwich & Johnsonville
Keesville, Ausable Chasm & Lake Champlain
Lake Champlain & Mineville
Lehigh Valley
Middleburg & Schoharie
Napierville Junction
New Haven
New York Central
New York, Ontario & Western
Pennsylvania
Rutland
Schoharie Valley
Southern New York
U. S. Govt.
Ulster & Delaware
Unadilla Valley

ers. The only concession made in bad weather is that trains wait at East Worcester for trainmen to set up retainers if the tops of the cars are ice-covered.

Going into Cobleskill the retainers on the rear half of the train are knocked down and the brakes on that portion of the train released. But another shoulder of the Catskills must be crossed, so as the engines approach the bottom of the sag they open up again and work steam in a wild dash to the top of the opposite rim, storming through the little town of Central Bridge like a hurricane. In a few more miles the second summit is reached, then trains pitch silently down the steep slope to the east while lanterns flicker back from car to car as the brakemen set up their retainers again to hold the heavy train under control.

At Delanson, near the top of the second summit, some freight trains leave the line for Albany, while the main line drops down into the valley of the Mohawk to Schenectady. Helpers are cut off at Mohawk Yard, northeast of the big General Electric plants on the other side of the river. In the old days, before the road changed from anthracite to bituminous coal as fuel, fires had to be cleaned at Mohawk on trains bound to and from Whitehall.

Two miles out of the yard, trains bound for Mechanicville diverge and turn east to run the little more than eight miles over joint track with the Boston & Maine. On the main line, trains hit the Saratoga-Champlain Division at High Street JS Tower in Ballston, at the south end of a long nine-degree curve which sweeps around the town.

The character of the railroad over the Saratoga-Champlain Division is far different from that of the rest of the railroad. While the southern divisions cross several stiff summits, the easy-going Saratoga-Champlain Division follows a nearly water-level route in a course that is almost due north. Perhaps you have noticed how the Hudson River and Lake Champlain form an almost straight line from New York City to Montreal. New York Central Lines have a sort of monopoly on the southern half of this important traffic artery, but the Delaware & Hudson rules in the north.

Almost the whole length of this division of the D&H is a land of vacation and all-year resorts. There are Ballaston Spa, Saratoga Springs, Lake George at the end of either of two short branch lines, Fort Ticonderoga, Crown Point and nearby Ausable Forks, while at the end of an 88-mile branch is one of the most famous winter resorts in America, Lake Placid.

If you were to ride a train from New York to Montreal it would be at Ballaston Spa that your cars would slip smoothly into the main line of the D&H.

For the next 46 miles the railroad runs almost straight—which is surprising, considering the number of hills on either side—and in this distance it never rises or falls more than a few feet. This part of the line might easily be called the race track, and as a matter of fact an electric railroad once paralleling it between Ballaston Spa and Saratoga Springs was known to give chase at times. The D&H itself once owned an extensive interurban empire in this vicinity (see map).

Out of Saratoga runs the Adirondack Branch with passenger service to North Creek. It was to here that the first D&H ski trains ran, and the town showed that northern hospitality is as warm and wide as any other variety. In summer, Saratoga is beautiful with wide, elm-shaded streets and the leisurely charm of a by-gone era. August brings the racing ponies, and every brakeman has a red-hot tip straight from the feedbox of the last horse-car.

Farther up the line lies Fort Edward, formerly a helper station and junction point with the important Lake George Branch. Yard engines work up the branch as far as Glens Falls to serve the paper mills and factories of the heavily industrialized region clustered about the power sites at the several falls in the Hudson River. Passenger service is maintained up the branch, which has grades of 108 feet to the mile and maximum curves of 10 degrees. At Lake George, a famous summer resort, passengers take the steamer ride on the beautiful lake. The marine track here is used to launch boats directly into the water from freight cars. Cars are backed into the water on a track that extends to a depth of 10 feet. When this track was built, rails were laid on the winter ice and they sank to the prepared bed in spring.

Whitehall, formerly a division point between the Saratoga and Champlain divisions, has a 25-stall roundhouse and yards south of the village at Tub Mountain. The 13 long tracks are switched by engines working from both ends. Here, also, the branch to Rutland, Vt., turns off. Passenger-engine crews were changed at Whitehall until 1933, when runs were extended from Albany and Troy to Montreal.

D&H freight on Erie's Jefferson Division near Starrucca, Pa. Donald W. Furler, 65 Glen Ave., Glen Rock, N. J.

When the old Rensselaer & Saratoga Railroad was built through Whitehall in 1843, the tracks entered Main Street at the south end of the town and proceeded down the center of Main Street for more than 1000 feet, then turned into Church Street. Church Street went over a hill but the tracks went through a single-track tunnel underneath and came out on the other side, about 700 feet farther on. For 90 years all trains ran down Main Street in this manner, until in 1933 a relocation was made which eliminated all grade crossings and the especially bad arrangement of a mainline railroad down the main street of a town. At the south end of town the tracks were moved about a half block farther east and kept in an open cut, and the former tunnel was also opened up into a cut.

Immediately north of Whitehall the railroad crosses South Bay, an arm of Lake Champlain, and follows the lake almost on the shore line for most of the way to Rouses Point, another 113 miles. In contrast to the line which we have been over, this is mostly single track. There used to be some rivalry between the engine crews who operated on the single track and those who had the comfort of the double. Crews working south of Whitehall were called the "Fireside Club." An instance of such rivalry is the story told by the single-trackers of a Colonie engineer [Colonie is the roundhouse near Albany on the double-track part of the division]. North of Whitehall there are considerably more curves and the engines pitch to the left and to the right as they skirt the steep winding shores of Lake Champlain. This Colonie engineer was working north of Whitehall when he sailed into a curve south of Clemens and made a wild sweep at the brake valve. When the engine slid to a stop and the veteran fireman and brakeman disentangled themselves, they demanded, "What's the matter? What's the big idea?"

"The block," said the eagle eye. "It's red. I don't understand it; the last one was clear and here this flops up on me."

"Nuts!" said the brakeman. "That's lighthouse No. 3 on Lake Champlain. You can't see the next block from here."

They also like to tell about the A&S engineer who was used north of Whitehall in an emergency. He had acquitted himself creditably and headed into Willsboro Rocks with a good swing on the train. Schuyler Island loomed ahead on the wide waters of the lake. The engine rolled from one curve into another and soon the island was on the right side of the engine. A few minutes later it was on the left side and the engine plunged into the 620-foot tunnel and emerged again high above the lake with the island still in sight. The engineer shook his head.

Optional routes

TRAINS each month prints a brief listing and survey of available routes between larger cities.

Chicago and St. Louis:

Competition between Chicago and St. Louis is almost as keen as between Chicago and the Twin Cities. All direct routes have runs under six hours. One of two sleeper oddities is the fact that the Wabash originates some sleepers at Delmar Station in St. Louis; the other is that the sleeper between Springfield and Chicago is handled by the Alton and the IC in alternate months as a wartime economy measure. The concentration of service just before noon and just before supper is notable—especially when seen from the St. Louis Station.

Alton—Most frequent service, including the only early-morning trip southbound. Night trains have sleepers; day trains, parlors; all carry coaches. Day trains include some streamlined units.

Wabash—This road loses some time by stopping all trains at Delmar Station, but the convenience thus offered offsets this slight delay. Coaches, parlors, sleepers, including the cars from Delmar. Three trains each way.

Illinois Central—Day train, night train, daytime streamliner; latter operates north in the morning, south in late afternoon. Sleepers, coaches, parlors; all seats reserved on the streamliner.

Chicago & Eastern Illinois—Day train and night train; sleepers, parlors, coaches. Through smaller towns than other roads.

Illinois Terminal-Rock Island—By no means a competitive route, but the run over these lines via Peoria is an interesting off-the-beaten-path trip.

"Get up here, boy," he said to the fireman, "and see if you can get away from that damned island."

FOR the next few miles Lake Champlain, to the east of the railroad, is only about a mile wide and entrenched between steep slopes. Along this stretch the fills sank time after time into the bottomless muck of the marshy lakeshore when the railroad was in its infancy. But this proved only a temporary obstacle to the well-heeled New York & Canada Railroad Company which had been formed to construct the road for the D&H. The hulls of hundreds of old canal boats were dragged into the marshes, loaded with stones and sunk, and fill built over them.

The traveler may detrain at Ticonderoga and take a steamer on nearby Lake George back for a connection to the Lake George Branch of the D&H, already mentioned. Lake George is, roughly, 30 miles long and parallels the main line of the D&H, though somewhat farther west, but here at Ticonderoga it is only two miles between Lake Champlain and Lake George. Lake Champlain is a natural channel for New York's extensive barge canal system, making through connections from the Hudson River to the St. Lawrence. The D&H once operated 140 route miles of steamship service on the lake.

As the main line northward skirts the lake it is always crowded between the shore and the Adirondack Mountains to the west. At some places the slopes are very steep and the tracks seem to be almost directly over the water.

At South Junction, a modern concrete coaling plant spans the tracks. This is the southward end of double track that extends a short distance to Plattsburg. It is also junction point of the branch to Ausable Forks. When former President L. F. Loree was attempting to get permission to discontinue passenger service on this branch line, his efforts were opposed by some well-known artists residing in the region. At first the State Public Service Commission did not grant the petition, and Loree ordered the conductor to take the names of all passengers using the train in an effort to gather data that would show the line was used by very few people.

When this edict went into effect the Ausable local enjoyed the patronage of the most distinguished company that had ever ridden on any carrier. The names given by passengers to the imperturbable conductor ranged from Julius Caesar and Napoleon Bonaparte to the latest and most lurid figures in the headlines. When other measures failed and the Public Service Commission still insisted that one train a day be operated, the resourceful chief of the D&H scheduled it to arrive at Ausable Forks at 2:30 in the morning. Soon after that crafty move his petition to discontinue the service was granted.

From Bluff Point, a few miles to the north of South Junction, another branch, formerly the narrow-gauge Chateaugay Railroad, leads up staggering mountain grades, 178 feet to the mile, to Dannemora, 1400 feet above sea level. The road was originally built by the state and was leased to private interests for $1 per year when it was found that prisoners from the state's Clinton Prison would not mine enough ore to make the venture a success. It was ex-

tended to Saranac Lake in 1888 and thence to Lake Placid. In 1903 the D&H took it over and changed it to standard gauge. The D&H's only mixed train runs over this section of the road from Plattsburg to Lake Placid, using 20 miles of New York Central track from Loon Lake to Saranac Lake to reach D&H iron again at Saranac Lake Junction for the remaining 10 miles into Lake Placid. New York Central trains also use this section of the D&H to reach that station.

Rouses Point is the north end of the D&H and is a railroad town of major importance for the interchange of freight between the roads that enter it. Champlain Division rounder crews tie up here for rest. They generally yard their inbound trains in the Stearns yard and get their southbound trains from the New Jersey yard, north of the Rutland diamond, or from Stearns or Cemetery yards near the roundhouse.

If the anthracite region could be called the heart of the D&H, Albany most certainly is the brain. Here in a very large building in Flemish Gothic style, looking more like a house of parliament than a railroad office, is the executive and managing center of the railroad and coal interests. The four stories of this impressive building extend the full length of a large open plaza, and its tower is 13 stories high. Behind are railroad yards and the Hudson River.

Albany is not on the D&H main line but is connected to it by branches from Delanson and Ballston Spa.

Albany's Union Station clears 150 daily passenger trains and is the third largest express transfer and sixth largest mail transfer station in the United States. The station is built on two levels with eight tracks on the upper level, used by the New York Central's mainline and the Boston & Albany trains almost exclusively. The D&H has a double-track connection via a steep ramp to this part of the station but uses it only to take delivery of the northbound *Laurentian* during the winter months. Most D&H trains share the lower level with NYC's West Shore Line.

Passenger service from Albany to Binghamton over the Susquehanna Division consists of two trains a day in each direction. Trains in this service generally leave from Track 9 or 10. Track 11 is used by trains of the Saratoga-Champlain Division; through cars from Lake George for New York are taken off the rear of the incoming train, backed up the ramp to the New York Central tracks and placed on the rear of a train that will take them on to New York. There are six departures and four arrivals on the Saratoga-Champlain Division each weekday while the winter schedule is in effect.

The nearby Troy Branch on the other side of the Hudson is important because it provides another less-congested connection with the New York Central over the tracks of the Troy Union Railroad, of which the D&H is quarter owner. The one-level station at Troy simplifies the operation as trains are received from or delivered to the New York Central System. Through Troy the *Montreal Limited* runs in both directions the year around, as does the southbound *Laurentian,* which is here combined with the Rutland Railroad's *Green Mountain Flyer* for movement to New York. The northward *Laurentian* is routed through Troy only on the summer schedule, running via Albany from September to June.

Coach yards, repair shops and roundhouse for the capital district are at Colonie, five miles north of Albany. Centralized traffic control, operated from the chief train dispatcher's office in Albany, handles 38 switches, 2 derails and 56 signals on the 6.6 miles from Albany to the north end of the junction with the Troy Branch.

The 361 D&H engines range from the old Mother Hubbards, double-cab engines built around the turn of the century, to the new K-class 4-8-4 with 75" drivers and a boiler pressure of 285 pounds per square inch. The old Mallets built in 1910 and 1912, the first superheaters owned by the company, with their 109,200 pounds tractive force are still the most powerful locomotives on the roster. Ten to 20 years ago D&H experiments with high-pressure compound locomotives aroused great interest. Beginning with the *Horatio Allen*, No. 1400, built in 1924, carrying 350 pounds of steam pressure, and continuing with the *John B. Jervis,* No. 1401, the *James Archibald,* No. 1402, and the *L. F. Loree,* No. 1403, built in 1933 by the American Locomotive Works, steam pressures were increased to 500 pounds per square inch in the water-tube boiler of the last of this series. The 1403 was a triple-expansion compound with cylinders at both the front and rear ends of the frame and four main rods transmitting the power to the main drivers. None of these locomotives eliminated the old difficulty with compounds—high maintenance of their complicated

valves—and the boilers had a tendency to develop new leaks every trip.

Passenger engines 651, 652 and 653, built in the company's shops, were more successful. Clean-lined, with smoke deflectors which have become a hallmark of the D&H passenger power, these locomotives are in service on the Montreal runs. The 653, with a tractive force of 59,500 pounds, is among the most powerful Pacifics in America. The 35 articulated 4-6-6-4's, put in service in 1940 and 1941, are so constructed that the weight is evenly distributed when the engines are climbing grades, as the water flows to the rear of the boiler and lightens the load on the front set of drivers.

The old E-2's, the ancient, battle-scarred 700's, bear the brunt of the work on the R&W Branch out of Whitehall. They wrack their old bones up the steep State Line grade and pound out their daily stint over Rupert Hill, where the track slopes up 71 feet to the mile. They perform switching service on the Lake George Branch and the steep Adirondack. The company's oil-burners of the 590 class were built for use on the Chateaugay Branch in 1911, and the 999, also an oil-burner, was built for the same territory in 1917. New York state law requires locomotives operating in the Adirondack Park, through which the Chateaugay Branch runs, to burn oil from April to November. Because of the war, coal-burning engines are in use on this branch now, but patrolling trackmen equipped to fight fire follow each train on track cars.

An outstanding characteristic of D&H's passenger equipment is cleanliness. Cars are scoured and scrubbed and polished inside and out. Soldiers and sailors, connoisseurs of coach travel, describe D&H passenger cars as the cleanest they have seen in their travels from coast to coast. The fine new air-conditioned cars put into service in 1940 are popular. Distinctively painted, with bottle-green body and a wide cream-colored panel, outlined with a red stripe enclosing the tier of windows, they are the target of every experienced traveler in the region. Older cars have been reconditioned and with the exception of individual seats are up to the same standards of comfort and cleanliness. The new color scheme is now being applied to all passenger cars—a pleasant change from the monotonous Pullman green that has been in use by the D&H ever since it abandoned the bright yellow used on coaches of the old D&H Canal Company's railroad.

More than any other man Leonor F. Loree, president of the Delaware and Hudson Railroad from 1907 to 1938, made the company a potent force in American transportation. A brilliant engineer and a first-class operating man, the bearded, highly individualistic Loree started his railroad career as a rodman on the Pennsylvania Railroad after his graduation from Rutgers in 1877. After serving with the Army Engineer Corps and as a civil engineer for the Mexican National Railroad, he returned to the Pennsylvania and rose through the grades from division superintendent to general manager, then to a vice-presidency in 1901. The same year he resigned to become president of the Baltimore & Ohio and while heading this company advocated the purchase of the first Mallet locomotives used in America. In 1904 he became president of the Rock Island and it was from this position that he went to the D&H.

A lifelong advocate of big power, he soon had Mallets rolling on the D&H. The first ones, built in 1910, were followed by larger and more powerful engines as soon as they cleared the erecting-shop floor. Shop operations were centralized soon after he took control. Each terminal had previously performed all operations involved in the maintenance and repair of locomotives and rolling stock. Under his direction Colonie became the back shop of all divisions for locomotive repairs. Oneonta, where the car shops had been established by the A&S in 1863, became a car-repair and construction center for the system. Green Island car shops, near Troy, also continued as a major car-repair point. Small terminals like Salem, N. Y., were eliminated wherever possible or reduced to mere tie-up points. Where grades were heavy and traffic dense, Loree built additional main tracks. From Pennsylvania to the Canadian border, he tightened up and polished and integrated the D&H into a smoothly functioning transportation system second to none.

A strong-willed, hard-driving man, it was inevitable that Loree should have many conflicts. He collided with labor on several occasions; he quarrelled with other railroad executives and he fought residents of branch-line communities who wanted to retain passenger services that they did not patronize. When the big eastern trunklines were apportioning smaller lines between them, Loree scared the daylights out of them by projecting a new railroad across Pennsylvania to tie in with his own D&H, the BR&P, the Lehigh Valley and the

The L. F. Loree, No. 1403, is typical of D&H experimentation in locomotive design. Notice the arrangement of the high-pressure cylinders under the cab and the low-pressure cylinders at front, both driving on the same axle. The 1403 was built in 1933 by the American Locomotive Company.

Wabash to establish a new transportation empire stretching from the Canadian border to southern Pennsylvania and from the Atlantic Ocean to the Mississippi. It would encompass the tonnage-producing centers of every major industry in that vast area and include most of the major cities from Chicago and St. Louis to the eastern seaboard. The Interstate Commerce Commission denied him permission to build across Pennsylvania; but his foray into the stock market, where he had obtained virtual control of Lehigh Valley and Wabash, netted the D&H millions. Money from the sale of these stocks was invested in 1932 with the purchase of 595,000 shares of New York Central stock. A substantial interest in the Central is still retained by the D&H, although stock holdings have been reduced to 304,600 shares.

Perhaps no single phase of Loree's long career was more turbulent than his relations with labor. In 1914 he went to the mat with the "Big Four" operating brotherhoods over the reinstatement of a number of trainmen and enginemen who had been discharged. When a strike was called and the D&H was tied up from end to end, he capitulated after 18 hours and reinstated the discharged men. His next battle was the shopmen's strike. He won an overwhelming victory. He quarrelled violently with the executive of a large eastern carrier who proposed settling with the strikers and carried his point that the railroads present a united front against the unions. This was in 1922, and the scars and bitterness engendered lasted for years in railroad towns along the D&H.

In 1931, he again came into conflict with the operating brotherhoods. He advanced a plan for paying men in train and engine service on a monthly basis, rather than on the prevailing hours and miles rates, long in use on the railroads. His proposal, always referred to as "the Monthly Plan," established rates for men in regular service on a basis of 30 eight-hour days or 240 hours; men on the extra board were to be paid on a basis of 20 eight-hour days or 160 hours per month. Hours in excess of 240 per month were to be paid for at time and a half. Engineers, for example, were to be paid $300 for 240 hours in regular service and $200 per month for 160 hours in extra service. Conductors, brakemen and firemen were each offered different rates of pay on a similar basis of computation. It abolished the time-honored hours or miles and the differences between freight and passenger service and yard and road rates as well.

Men were called in individually by officials and offered a contract to sign, embodying provisions of "the Monthly Plan," and it was strongly intimated that those who did not sign would not be continued in the company employ. This, of course, would have circumvented the operating brotherhoods' contracts with a series of personal agreements between the company and its engine and train employees. The unions' objections to "the Monthly Plan" were that it abolished overtime payment, as the monthly time was computed on a chronological basis regardless of the hours put in on any one day. When men reached 240 hours they were pulled out of service and furloughed men were recalled to work four or five days each month. The unions pointed out that men on regular jobs had been restricting their mileage to provide a maximum of employment, and that extra men had benefited directly from the efforts to divide existing work among as many as possible to avoid the furloughing of men during a period of widespread unemployment and

Frank Quin

Engine 1122 wheels BM-1 (Binghamton to Mechanicville) past GX Tower. Below, Train 305, Binghamton to Albany, rolls into Sidney behind Engine 522, a trim Ten-Wheeler. On the opposite page is Train 302, Albany to Binghamton, getting under way from Sidney with a minimum of smoke. Engine 505 is also a Ten-Wheeler.

Frank Quin

Frank Quin.

tress. They also objected to the elimination the wage differentials between road and yard d passenger and freight service.

The brotherhoods, faced with the choice of cepting "the Monthly Plan" or getting no ntract with the company, signed on the dot- l line. Loree's victory was short-lived. Sev- al years later, when conditions were more vorable from their point of view, the brother- ods again locked horns with the bearded old ss of the D&H. After they had voted to strike less the company discontinued "the Monthly an," a fact-finding committee, headed by Ad- ral Grayson, was appointed by the President the United States. After lengthy hearings in bany the committee recommended that the mpany return to its former method of pay- g its train and engine service employees. ese recommendations were accepted. More cently the shopmen's unions which lost out the strike of 1922 have won representation ctions and are once more recognized.

A committee of firemen one time went to bany to request that stokers be applied on me of the larger locomotives. They saw the derly Loree and stated their purpose.

"Stokers!" he expostulated, his whiskers rly bristling. "I get the best stokers that a llar and a quarter can buy. They're 'Red lges' [a well-known brand of shovel], and yone that doesn't like them can quit."

D&H firemen had another inning, though. Testifying before members of the I. C. C. in the stoker hearings, they brought out the fact that hand-fired Mallets in pusher service on the grades of the Pennsylvania Division burned, during a 16-mile trip lasting 1½ hours, more than five tons of coal. Muzzle-loading Consolidations, they said, burned 15 tons of coal on a 134-mile run that took less than eight hours.

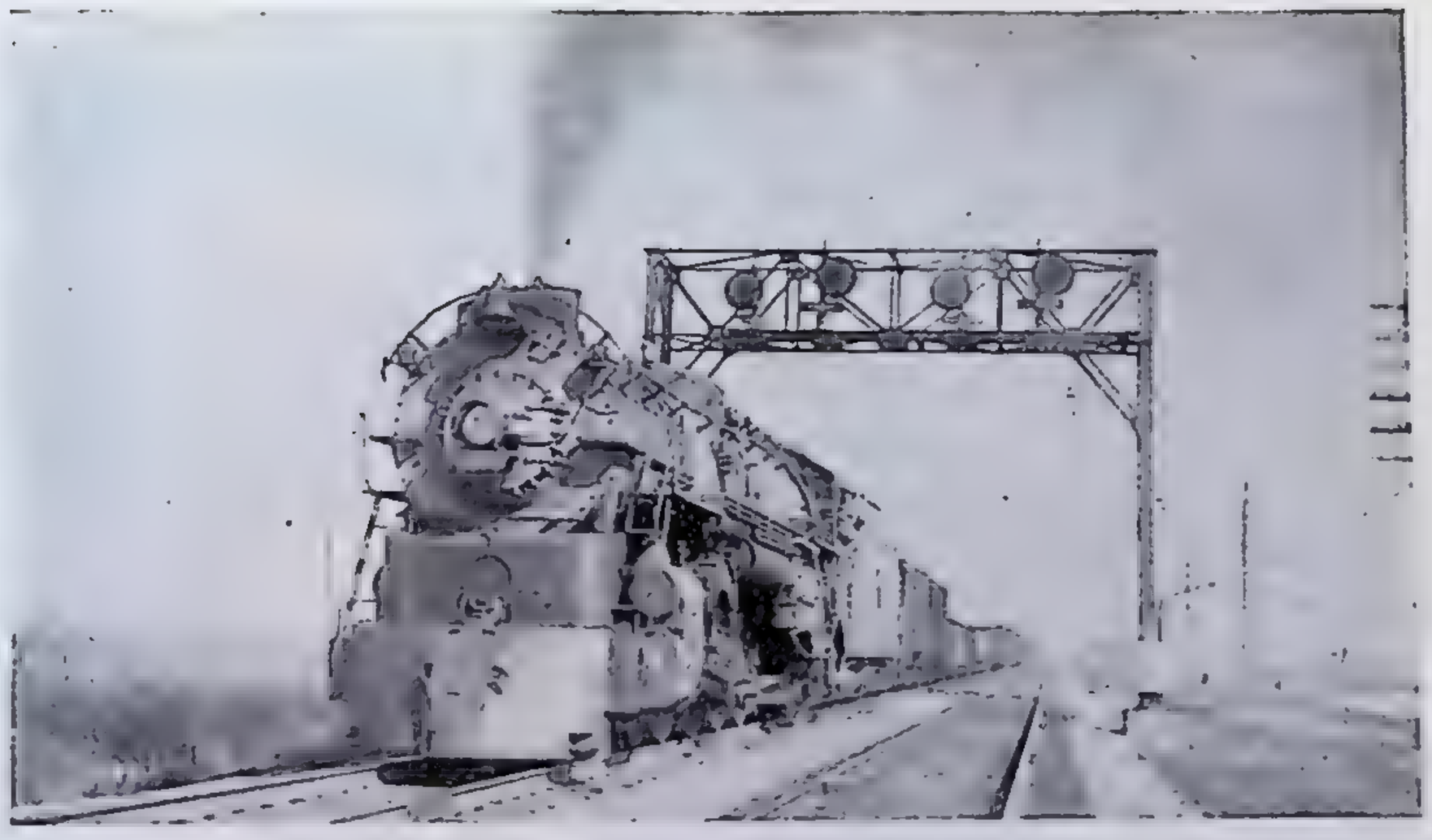
The Delaware & Hudson Railroad today has 9800 employees and about 2000 more now in the armed services. In 1939 it had 6325 employees; operating revenue from freight amounted to $23,231,537 and from passengers $1,798,750 to produce a net operating income of $5,519,101 and net income of $1,593,023. In 1942, after our country had entered the war, operating revenue from freight had risen to $42,828,000 and passenger revenues were $1,651,000. Net operating income almost doubled to $10,424,000.

The future of the company is linked inextricably with the coal industry, and the tariff policy in Canada is also an important factor in the affairs of the company. New furnace-tending equipment holds some promise for the future of anthracite fuel and a hope of increased tonnage volume for D&H. Superbly equipped, expertly operated, the historic old railroad is well prepared to meet any demands that may be made upon it.

The Flyer Passes a Freight

BY L. E. GRIFFITH

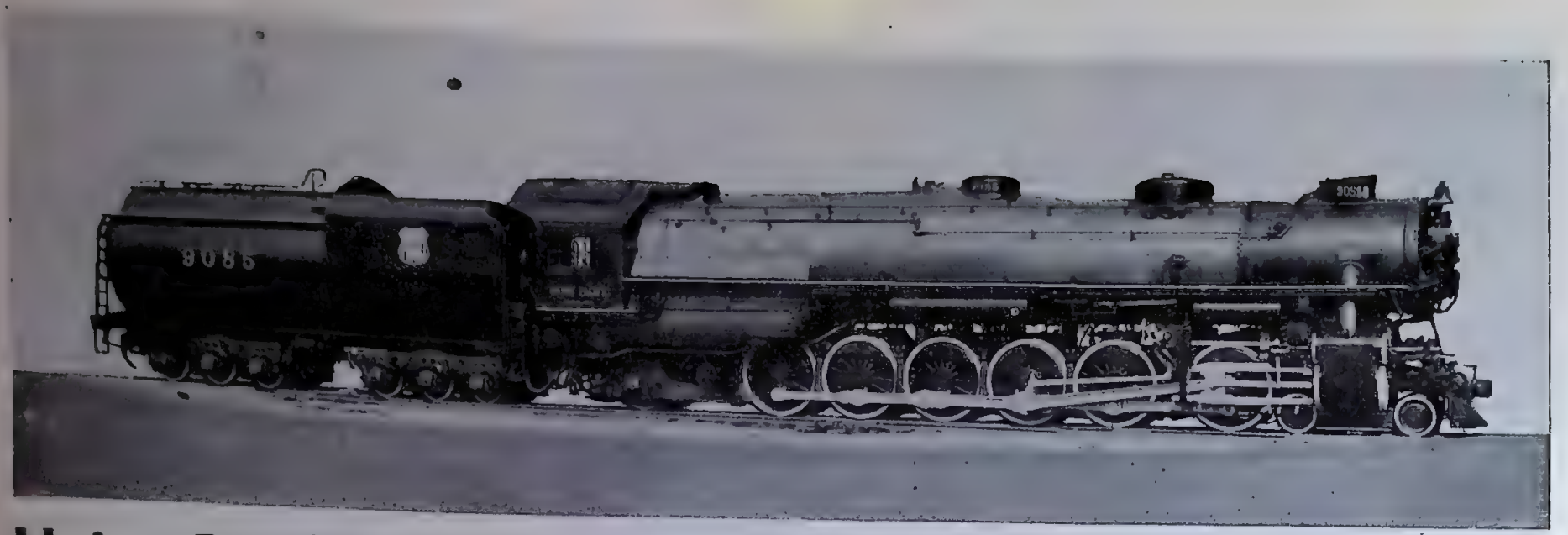
Every afternoon the Burlington puts on this 10-minute action sequence near Somonauk, Ill., 59 miles west of Chicago. No. 39, the Exposition Flyer, headed by an S-4a Hudson-type engine, passes freight train No. 67 (above). Ten minutes earlier No. 11, the Advance Flyer, had come down the track at better than 85 miles per hour behind one of the Q's passenger Diesels. The signal bridge is a mile west of the scene of the upper photo, where 67 is in the siding for the two flyers. This is good fast territory for Diesels or steamers, straight track with only the most gently rolling grades.



After the two Flyers are by, the freight gets under way. The 5630 was sending out a real exhaust bark when this picture was snapped. Notice the engineer, fireman and head brakeman all in the gangway to get into the picture.

This is freight train 67 on a different day, waiting in the siding for two Flyers. This time it is hauled by one of the Burlington's high-domed Mikados instead of by one of the newer Northern types.

And still again, here is 67 in the siding with 4-8-4 engine 5611. This time I concentrated on the locomotive, which is capable of handling practically anything on the system. It was this type of engine which handled the record 82-car mail train operated by the Burlington last October 17.



Union Pacific 4-12-2

UNIQUE in its wheel arrangement is the Union Pacific's 12-coupled three-cylinder locomotive type. At the time the first of these engines were built in 1926, and probably today as well, they were the largest non-articulated locomotives in existence.

The design of this class was the result of comparative operating tests of 2-10-2, 4-10-2, and 2-8-8-0 locomotives in fast freight service. The 2-8-8-0 Mallets could handle heavy trains over the more gently rolling sections of the UP, but at speeds of only up to 20 miles per hour. The road wanted a locomotive which could take the same train weights at double the speed.

In order to stay within the weight restriction of 59,000 pounds per axle, a 12-coupled wheel arrangement was necessary. A conventional two-cylinder engine, with both sides coupled to the same main drivers, would have put too much strain on one driving axle, so a three-cylinder arrangement was adopted with the center cylinder driving on the second axle while the side rods drove the third.

In performance these machines are satisfactory, and 88 of them were built. Today they are working between Omaha and Cheyenne, Laramie and Green River, Green River and Huntington, and Omaha and Kansas City. Over the 0.82 per cent ruling grades of the Laramie-Green River main line they have proved capable of taking the same trains as 2-8-8-0's but at nearly double the average speed. No fundamental changes of design have been made, but the drafting arrangement and grates have been modified to improve efficiency and some detail parts have been redesigned.

Principal Dimensions:

Road numbers	9000-62; 9500-14; 9078-87
Date built	1926-1930
Tractive effort, lbs.	96,650
Cylinder diameter and stroke, in.	Inside 27 x 31 Outside 27 x 32
Driver diameter, in.	67
Weight on drivers, lbs.	372,000
Weight on pilot truck, lbs.	81,000
Weight on trailing truck, lbs.	62,000
Weight of engine, lbs.	515,000
Weight of tender, lbs. (2/3 load)	308,800
Steam pressure, lbs.	220
Grate area, sq. ft.	108.25
Evaporative heating surface, sq. ft.	5853
Tender capacity: Gals. of water	18,000
Tons of coal	22

Two New 4-8-4's

FROM its original order of 4-8-4 locomotives, built in 1929, the Rock Island has expanded to 75 of these engines, including the latest order of 10 built by American Locomotive Company. While some of this type handle heavy passenger trains on all parts of the Rock Island's main line, these new 10, all oil-burners, are regularly assigned to freight runs between Kansas City and Dalhart, Tex. They are equipped with roller bearings on all axles and rods.

The 4-8-4 wheel arrangement becomes more nearly ubiquitous with the delivery by Lima of eight new 4-8-4's to Central of Georgia. Probably because of W. P. B. regulations against new locomotive design work, these are similar in many dimensions and details to the 4-8-4's, also Lima-built, of Southern Pacific. They are, however, somewhat lighter in total engine weight, and carry 10 pounds less boiler pressure for a somewhat lower tractive effort.

Principal Dimensions:

	CRI&P	CofG
Road numbers	5100-5109	450-457
Tractive effort, lbs.	67,000	63,200
Cylinder diameter and stroke, in.	26 x 32	27 x 30
Driver diameter, in.	74	73½
Weight on drivers, lbs.	280,000	260,000
Weight on pilot truck, lbs.	87,500	78,900
Weight on trailing truck, lbs.	99,500	108,300
Weight of engine, lbs.	467,000	447,200
Weight of tender, lbs., (2/3 load)	301,800	196,500
Steam pressure, lbs.	270	250
Grate area, sq. ft.	96.3	90.2
Evaporative heating surface, sq. ft.	4573	4705
Tender capacity: Gals. of water	21,500	13,000
Gals. of oil	5,500	
Tons of coal		21

Harvey Eucker. Courtesy Milwaukee Road.

This Is a Lidgerwood

"What is a Lidgerwood?" was the $64 question in the editorial rooms of TRAINS following publication of Douglass Welch's story on the Pacific Great Eastern in the December issue, in which two Lidgerwoods were listed as part of the road's equipment. J. C. O'Hearn, research editor, went to work and located the accompanying picture of one in the Milwaukee Road's files.

The Lidgerwood, not now in common railroad usage, is a sort of mechanical mule which takes steam from the locomotive boiler to operate a powerful winch. In earlier days it did much of the construction and maintenance work now accomplished by tractors and bulldozers. The one pictured is out of service, as are all of the Milwaukee Road's Lidgerwoods.

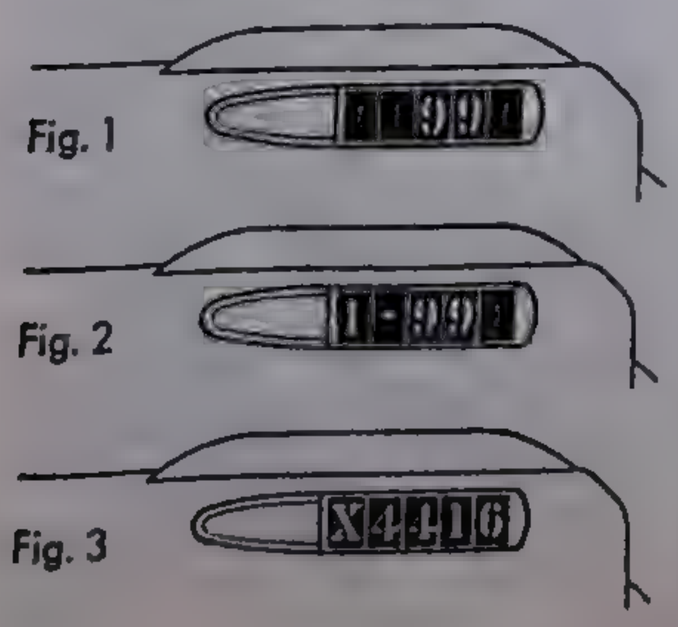
Oldest Name Train

Some authorities credit the *Federal* of the New York, New Haven & Hartford as being the oldest name train in existence in the United States, basing their claim on the fact that the Federal is now what used to be known as the *Washington Night Express*, which made its first run from Boston on May 8, 1876. The name of the train was changed on November 19, 1893, giving credence to the opinion of other authorities—among them Charles E. Fisher, president of the Railway and Locomotive Historical Society—that the *Federal* is not the oldest name train. Other old name trains include the *Hummer* of the Alton Railroad, installed April 4, 1880, and the *Fast Mail* of the Burlington, which was placed in service in 1884.

Southern Pacific Train Numbers

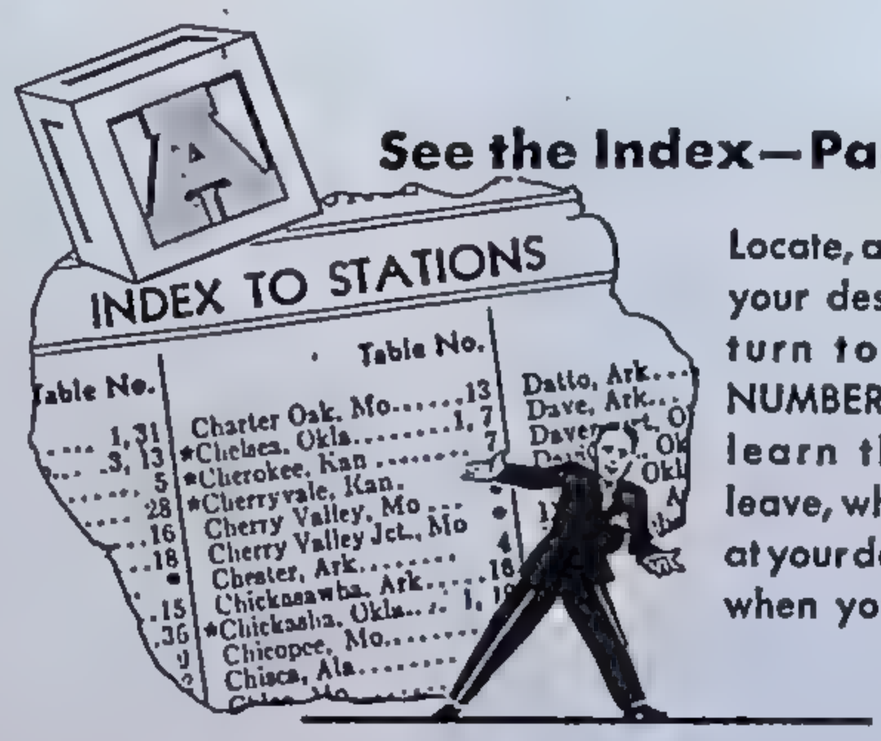
On each side of the smoke stacks on Southern Pacific locomotives are lighted train numbers. As on most U. S. railroads, westbound trains carry odd numbers; eastbound, even numbers ("east is even"). Fig. 1 is an example of the number on a westbound train.

To denote a train running in sections, the number of the section is prefixed as in Fig. 2, illustrating the first section of Train 99. Extra trains are assigned the number of the locomotive with the prefix "X" as in Fig. 3. In this case, of course, a westbound train may carry an even number because its locomotive happens to have an even number, and train orders therefore are addressed to "X4416 West" or "X4416 East."

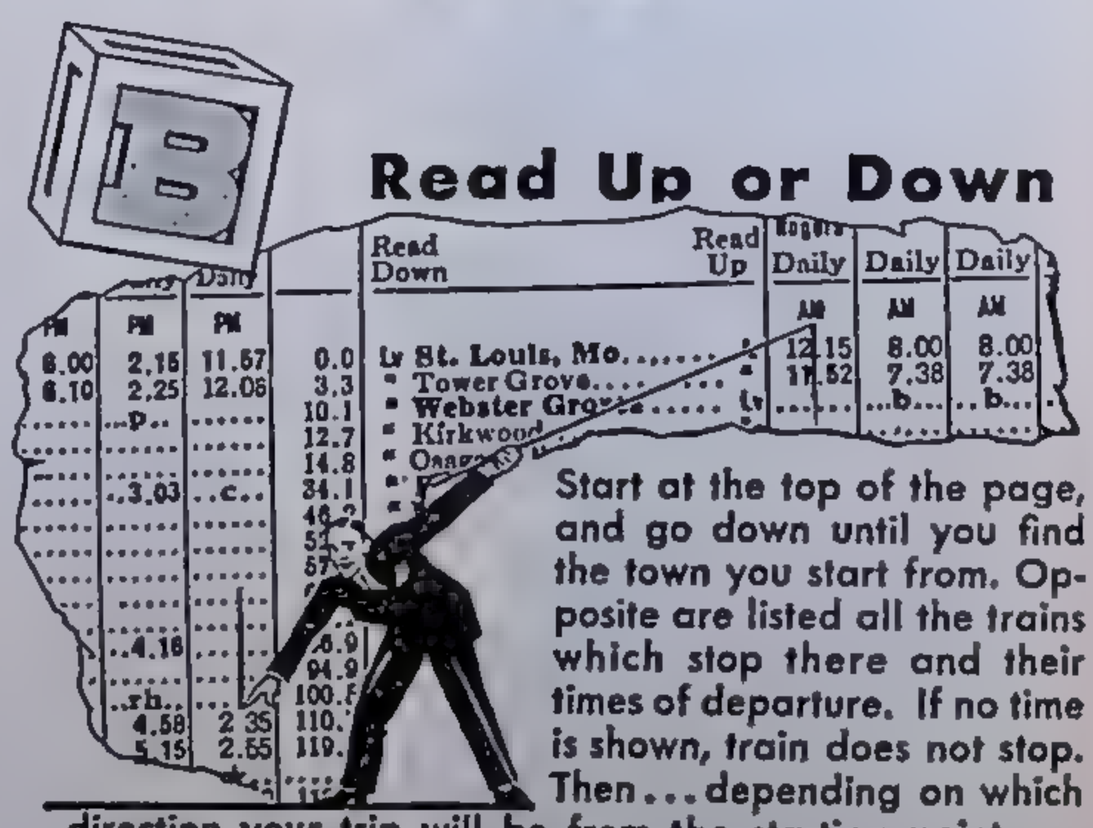


How to Read a Timetable

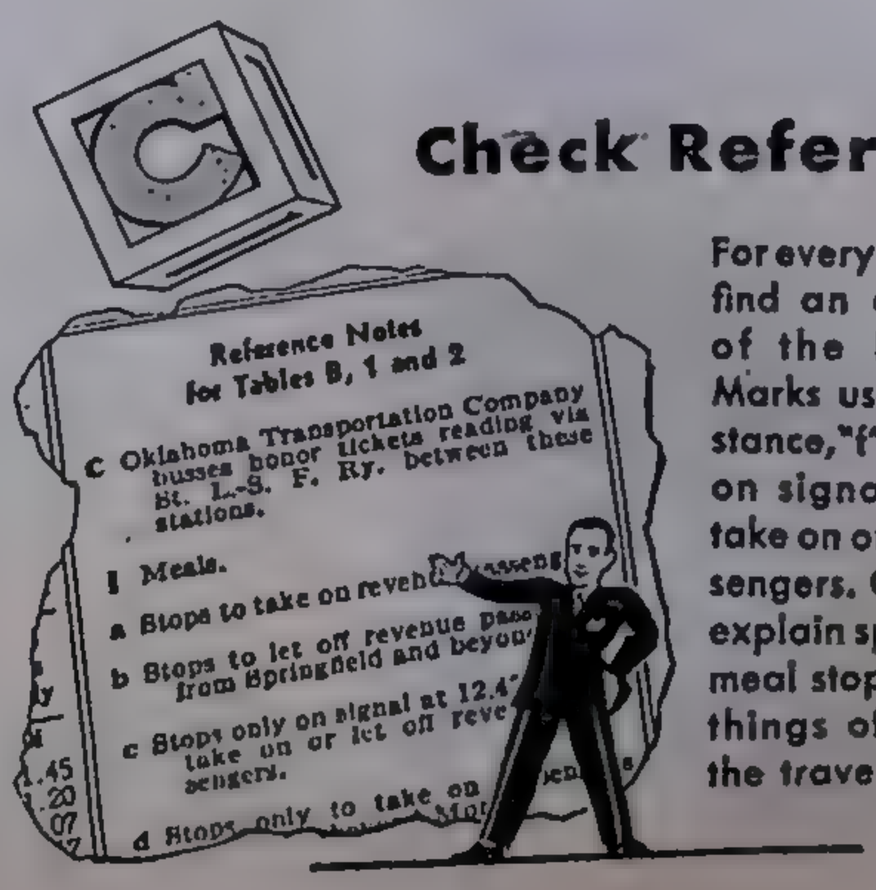
"As complicated as a railroad timetable" has long been a popular expression, and nearly everyone, from third-grade pupils to students of relativity and fourth dimension, has found difficulty interpreting schedules. Believing, however, that reading a timetable can be as simple as the ABC's, the Frisco Railway devoted a page of its December folder to suggestions as to how to read it. The illustrations below were taken from that folder, illustrating how to find the proper timetable, how to read it after you find it, and how to find additional information such as which trains stop on signal only, where off-train meals can be obtained, where conditional stops are made, etc.



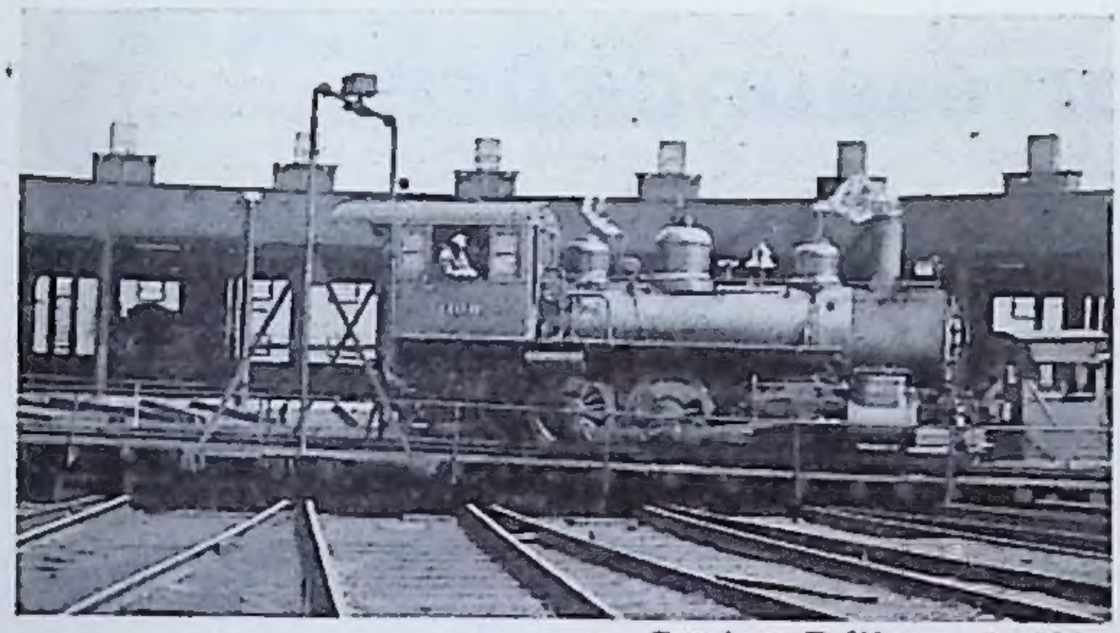
Locate, alphabetically, your destination, then turn to the TABLE NUMBER given. You'll learn the time you leave, when you arrive at your destination and when you can return.



Start at the top of the page, and go down until you find the town you start from. Opposite are listed all the trains which stop there and their times of departure. If no time is shown, train does not stop. Then . . . depending on which direction your trip will be from the starting point . . . read up or down until you locate the name of your destination and read opposite it the time of arrival.



For every table, you'll find an explanation of the Reference Marks used. For instance, "f" means stop on signal ("flag") to take on or let off passengers. Other marks explain special stops, meal stops and other things of interest to the traveler.



Courtesy Baltimore & Ohio.

A New One for the Book

Here is a Baltimore & Ohio locomotive running without a tender, although it is not a tank engine. Close examination of the photograph will show the tender in a stall of the roundhouse. This engine is used at Riverside, Baltimore, to switch tenders from engines undergoing repairs in the roundhouse, taking the tenders to the coal tipple and penstock and then switching them back into the roundhouse to be coupled onto their locomotives. The turntable is not large enough to accommodate the 1106 and its own tender plus the tender from the road engine, so it leaves its own tender behind, making frequent trips back to it for coal and injections of water in between the switching operations.

Wouldn't it be nice if:

. . . the railroads assigned passenger conductors on the basis of their ability to deal pleasantly and successfully with the public instead of on a basis of their seniority? M. Rossner.

. . . the railroads could work out a way of pricing first-class accommodations so that there would be only one price for basic railroad transportation plus an extra amount for sleeper and parlor-car accommodations, rather than the present confusing two classes of railroad tickets plus space charges? All the passenger is interested in, after all, is the difference in cost between a berth and sitting up all night. He doesn't care about the split between the railroads and the Pullman Company. Frank Wolfe.

. . . after the war, car windows were washed at each division point—especially on lines where there are a lot of tunnels? Ed Riebau.

. . . a universal credit card were issued enabling railroad travelers to charge tickets? With such a system it would be possible to purchase a ticket anywhere on U. S. railroad lines and be billed for it at the end of the month.

Victor Willard.

. . . TRAINS readers would write in more "Wouldn't it be nice if's"?

The Wouldn't-it-be-nice-if Editor.

Contributions to this department should be addressed to "Wouldn't It Be Nice If" Editor, Trains, Milwaukee 3, Wis.

Railroads and coal

The Delaware & Hudson (see page 24), the Philadelphia & Reading and several smaller roads have their entire histories intimately tied up with the mining and transportation of coal. Many railroads not only are corporations operated for the purpose of transporting coal and other merchandise, but they are actively engaged in the mining business too. Here is the world's largest coal breaker, which is operated by the Philadelphia & Reading Coal & Iron Co., an affiliate of the Reading system. Coal is hoisted out of the mine in the long incline conveyer, prepared for shipment and chuted into cars. The building is at Locust Summit, Pa.

Harold M. Lambert. Copyright.

We've done it again

Although we didn't move across town, as in 1943, we have moved. Our business office attaches are now ensconced in newly acquired second-floor space while the editorial and production departments of TRAINS and THE MODEL RAILROADER remain on the third floor. It took only three days to move but it required three weeks of preparation by electricians, carpenters, steamfitters and painters.

Among the craftsmen was one "Slim" Smukowski, a genial six-foot-three master of the saw and hammer. He first put in his appearance about 14 months ago when Joe (Stinkee) O'Hearn, TRAINS research editor, requested a bookcase for the reference library. Joe and Slim took an immediate liking to each other and the bookcase grew to two while Slim allowed as how "I'll have to come next week to finish them."

Toward the end of the second week Al (Mr. Stinky) Kalmbach, editor, announced he was leaving on a three-week trip. Joe and Slim went into a huddle as Al left. When he returned he couldn't find his office. It had been torn down, rebuilt elsewhere, refurnished and modernized. Al liked it, as did Andy (Stinkye) Anderson, managing editor, Hank (Stinkey) Kirtland, business manager, and Linn (Stinkie) Westcott, in charge of books, maps and magazine presentation. They all went into a huddle with Slim. Offices were rebuilt and redecorated. Weeks turned to months and Slim allowed "I like the place and can see a future here." It looked as though he was right, too, when Frank (Stinki) Taylor, editor of THE MODEL RAILROADER, took Slim into his office and closed the door. Two weeks later, after much sawing and hammering, they emerged from another new office.

Meanwhile, Bob (Steenkee) Fakler, production manager, had taken a liking to Slim. He got a new office, too.

Slim departed, but not for long. When the second-floor space was acquired last month he was back. Hank Kirtland is now in his new office on the second floor, surrounded by *six lovely* (you've got to pay compliments as well as wages these days) girls who help him run the business. There is a new reception room furnished in modern style. Slim has left once more, but Joe allows as how "maybe we'll soon need another bookcase."

Oh, yes, about the six lovely girls mentioned above: There's Mildred, who receives your orders; Roine, who enters them in the books; Virginia, who prepares the subscription forms; Margot and Lorraine, who make up the subscription plates; and Patricia, who double-checks each process.

Kalmbach Publishing Co.

1027 N. 7th St. Milwaukee 3, Wis.

Correspondence

For six consecutive Sundays during the middle of the summer, the New York, Susquehanna & Western runs a train from Jersey City to Stillwater, N. J., and return. Although this train was originated to give Boy Scouts of northern New Jersey a day in the country, it carries regular passengers throughout its run. Consequently, the Susquehanna's trackage from Butler to Stillwater has the convenient passenger service of six trains a year!

Arthur Knauer, M. I. T. Dorms, Cambridge 39, Mass.

The Texas & Pacific 900's, with their flared-stack Elesco feedwater heaters and outside piping, are to me one of the outstanding features of the *Sunshine Special*, a train that I rate second to none.

Wesley Willett, Pollock, La.

If that is a photograph of the *Merchants Limited* on page 16 of the November issue, I'll eat my G. I. shoes! As a railroad fan from Waterbury, Conn., I have yet to see the *Merchants* include streamlined day coaches in its consist. Nor have I yet seen the *Merchants* run in more than one section, and the locomotive in your picture apparently bears green flags.

Cpl. Thomas J. Donahue, Army Air Forces.

[Save your shoes, Corporal. The New Haven informs us that the train in question "is neither the *Merchants* nor the *Yankee Clipper*. The two cars behind the tender are streamlined coaches, and the consist of the *Merchants* has always been parlor, club and lounge cars. In its 40-year history it has never carried coaches. The *Merchants* has operated in sections on occasion, but this has been very infrequent." We're sorry. —*Ed.*]

It's too bad there isn't more interest in out-of-the-way railroads, for I have seen many fascinating ones in the course of the war. I expect to be an authority on the Japanese lines before it's over.

Lieut. C. S. Small, U. S. N. R.

We of the present time have been fortunate in witnessing perhaps the greatest development of the American steam locomotive. It might be quite safe to say that the past decade has produced as many improvements in motive power as a like period from about 1900 to 1910, when the trend started toward bigger and heavier engines. From 1934, when the present building program got under way with Alco constructing several 2-8-4 and 0-8-0 types, the designers and builders have placed on American railroads vastly improved, highly efficient machines. Only a few new types made their appearance. Of these, it seems the 4-6-6-4 type is outstanding. Many of us old "dyed-in-the-wool" class viewed with scorn the nightmares called "streamlining." Yet, underneath, it was the same motive power. From one extreme to the other, 4-4-4's to 4-8-8-4's!

F. Ray McKnight, U. S. Army.

Since I have been over here [England] I have been doing a great deal of traveling on the railroads, especially London & North Eastern. Most of the time one has to stand up, but, nevertheless, the British certainly have a wonderful railroad system.

T/Sgt. Robert A. Hadley, U. S. Army.

Answers to quiz (page 12)

1, Burlington Route. 2, Pennsylvania. 3, New York Central. 4, Rock Island. 5, Milwaukee Road. 6, Baltimore & Ohio. 7, Louisville & Nashville. 8, Chicago & Eastern Illinois. 9, Illinois Central. 10, Wabash. 11, Southern. 12, Misssouri Pacific. 13, Southern Pacific. 14, Frisco. 15, Duluth, South Shore & Atlantic.

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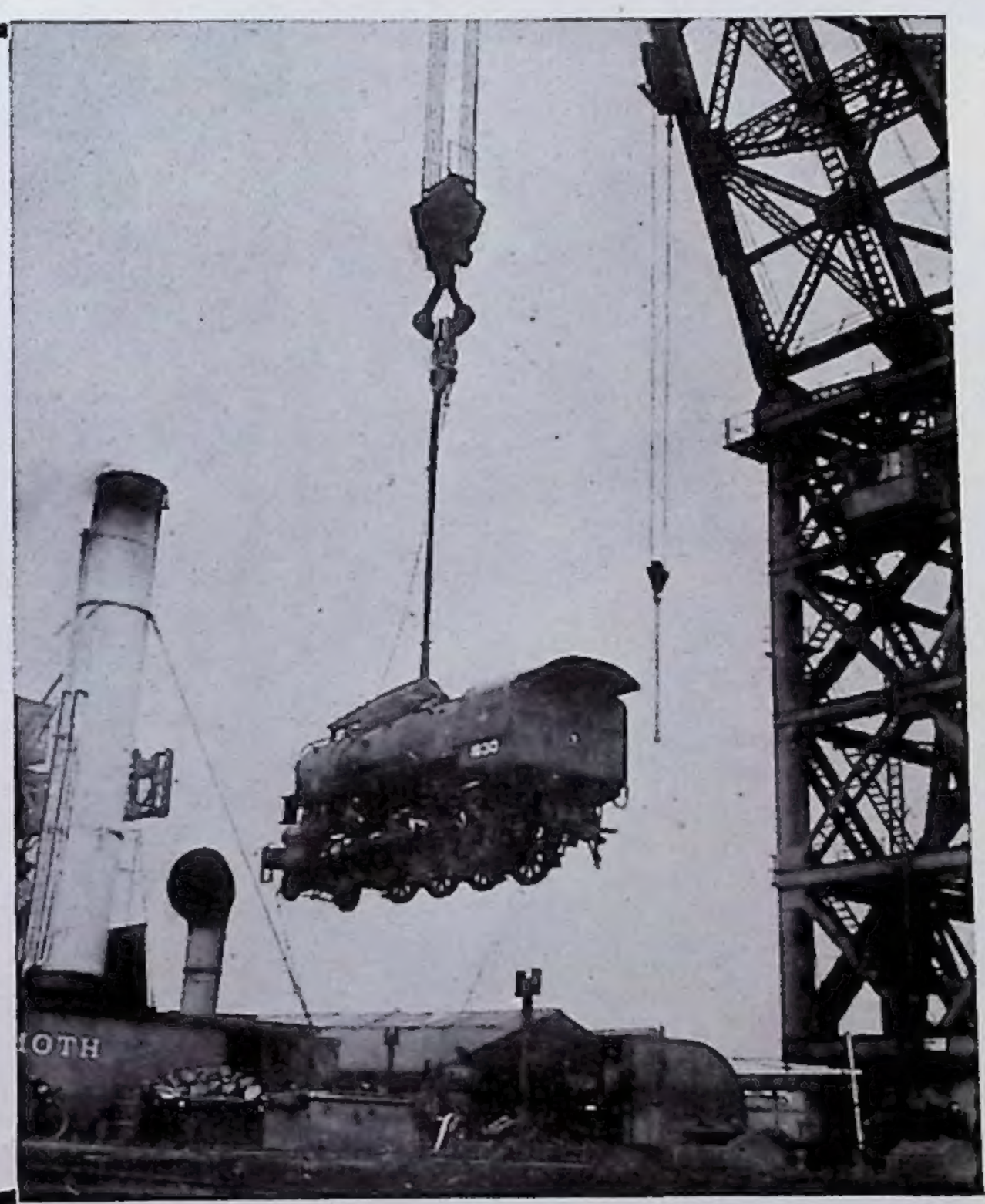
of these Lima-built locomotives are already in service in—or on their way to—the British Isles. Built to conform to the British track gauge, all decorative work and superfluous metal has been discarded. Their somewhat severe, but workmanlike, appearance has led the British to refer to them as "Austerity" locomotives.



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Only a very few, less than 32 per cent, of the photos in these albums have appeared in Trains or elsewhere.

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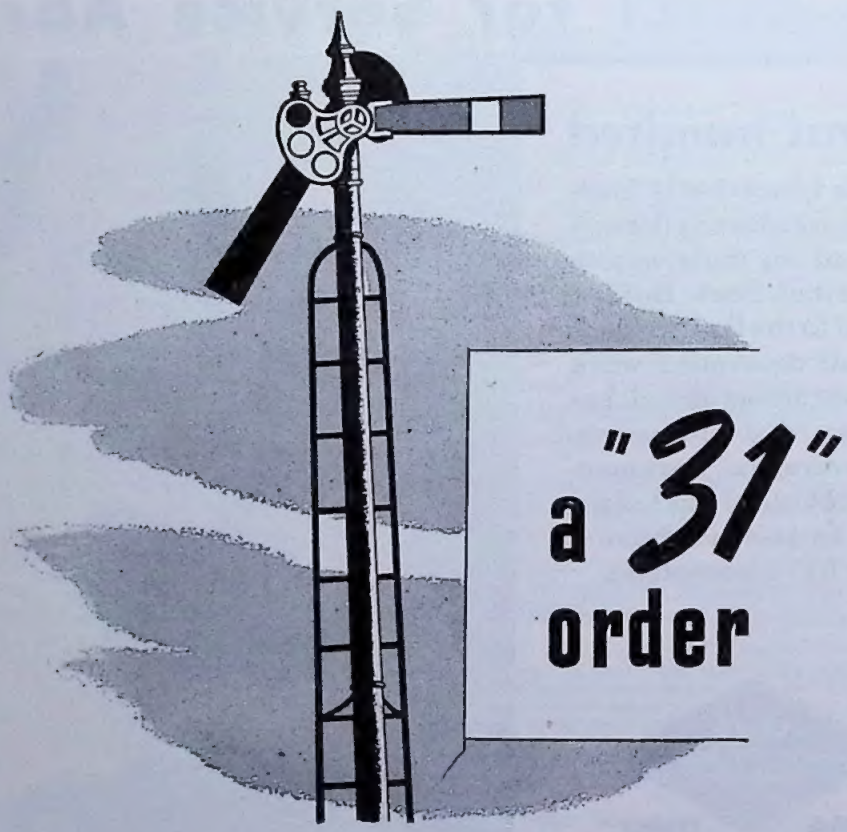

The wires hum. It's a "31" order—important instructions for a train soon to arrive and for which the conductor must sign. The station agent sets the semaphore. The red light flashes its warning. The train arrives and rumbles to a stop.

This is just one of many safety measures established by Union Pacific to assure reliable transportation of passengers and freight. War resulted in a tremendous increase in rail traffic. As might be expected, a large part of that traffic has been directed over Union Pacific's "strategic middle route" uniting the East with the Pacific Coast.

Through constant vigilance and tireless effort on the part of employes, thousands of men and trainloads of materials have been moved efficiently and quickly to aid the Allied cause.

* * * *

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★ *Listen to "YOUR AMERICA" radio program on Mutual nationwide network every Sunday afternoon. Consult your local newspaper for the time and station.*

THE PROGRESSIVE

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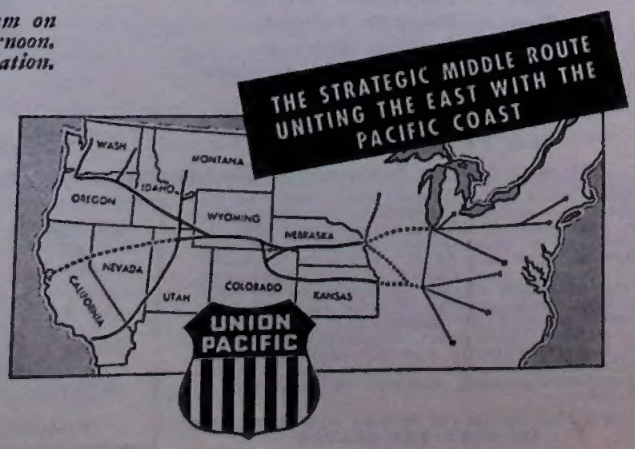
RAILROAD